OBSERVATIONS

Made by

Richard Hall,

OF THE

CITY of DUBLIN,

HEMP and FLAX Dreſſer's

ON

The Methods uſed in *HOLLAND*, in Cultivating or Raiſing of HEMP and FLAX.

AND LIKEWISE,

His REMARKS on Mr. *SLATOR*'s Book.

DUBLIN:
Printed by GEO. GRIERSON, at the Two Bibles in
Eſſex-Street. M, DCC, XXIV.

OBSERVATIONS

MADE BY

RICHARD HALL,

ON THE

METHODS uſed in *HOLLAND*, in Cultivating or Raiſing of FLAX and HEMP, *&c.*

SECT. I.

Of the Choice of the Soil.

IN the Province of *Holland*, there is a Country known by the Names of *Targou* and *Gouda*; it is there that they raiſe the beſt Hemp the *Dutch* are Maſters of: The Soil is exceeding deep and rich. They frequently make uſe of

Targou & Gouda.

Ley-grounds. of Ley-grounds for ſowing of Hemp in; yet do they not ſo far confine themſelves in that Particular, but that they often continue to ſow the ſame Soil with Hemp, for many Years ſucceſſively, only Every 2 Years the *Dutch* recruit their Soil. every two Years they recruit their Soil thus, *viz.* When they have pulled their Hemp, they rake together all the Graſs, Weeds, and Traſh which they find on the Ground, and lay them in large Heaps to rot: Theſe Heaps are made thus large, to the End the Sun may not exhale the Vertue from the Dung, ere it is ſpread over their Hemp-grounds. And they alſo gather what Sluſh is waſh'd from out of their Lands, into their Trenches or Ditches: This Sluſh they lay in Heaps, ſometime in the Month of *Auguſt*, and there let it lie the whole Winter; only they turn it often with the Spade.

Targou or *Gouda.* This *Targou* or *Gauda* is a large Country, and for near twenty Miles together, is exceeding fertile and proper for Hemp; which the State obſerving, they formerly gave great Rewards to the Boors, to induce them to be induſtrious in the raiſing of this uſeful Plant: But theſe Rewards were not of long Continuance; becauſe the

State

States ſoon perceived, that the Boors had their Accounts ſufficiently anſwered by their Profits.

A Farmer or Boor in *Targou* or *Gouda* ſeldom ſows more than two Acres with Hemp, and many of them leſs, that he may the better manure it; and alſo, that the pulling of the Hemp may not divert his Servants from their other Buſineſs.

A Farmer in *Targou* ſeldom ſows more than 2 Acres with Hemp.

SECT. II.

Remarks on the Soil of Ireland, *as to Hemp.*

IReland has great Quantities of Land proper for Hemp, eſpecially in the Counties of *Limerick*, *Clare*, *Kerry*, *Tipperary*, and ſome Parts of other Counties. It is not to be expected, that the Lands in each of theſe Counties, ſhould hold equally the one as the other. Doubtleſs the Corcus-lands of the Counties of *Limerick* and *Clare*, which have been gain'd from the Sea this many Years, and are vaſtly rich, will ſtand

Land, proper for Hemp.

Corcus-lands.

Up-lands.

longer under Culture, than even the Up-lands of the ſame Counties can. Likewiſe, the Up-lands of the County of *Limerick* are much more fertile, than the Generality of the other Lands of the Kingdom. Even thoſe Up-lands laſt mentioned, ought to be frequently changed, for the Benefit and Advantage as well of the Husbandman as of the Publick: For ſince three Plowings muſt be made for Hemp, the Husbandman muſt be very much wanting to himſelf, that does not aſſoon as his Hemp is off the Ground, give it another Plowing, and ſow it with Winter-grain.

Three Plowings to be made for Hemp.

Corcus-lands.

The Corcus-lands of the Counties of *Limerick* and *Clare* are violently hot, and therefore apt to throw up large ſtalk'd Hemp, which never skins ſo well as the midling Hemp of five Foot high: Yet I am of Opinion, that if theſe Grounds were ſucceſſively ſown with Hemp for ſome Years, their Fire would ſoon abate, ſo as they might be brought to yield Hemp nothing inferior to the *Dutch*; provided they were as skilfully and diligently manured.

Canals.

Holland not only abounds in Canals for publick Uſe, but alſo in a

Multitude of private ones; there being ſcarce any Commodity that is not brought to their Doors by Water. It is true *Ireland* has not the Advantage of artificial Canals; but there is no Spot of Earth in the World better furniſhed with Rivers, either naturally navigable, or capable of being made ſo on eaſy Terms, than *Ireland* is: Therefore, to ſay nothing of the many other Rivers in *Ireland*, what vaſt Quantities of Hemp might the *Shannon*, the *Barrow*, the *Noar*, the *Sure*, and the *Black-water* furniſh to Facturies for Sail-cloth or Cordage? The Facturies for Sail-cloth at *Waterford*, *Rakeil*, and *Dunkittle*, are not only well placed for Water-carriage, which is a great Article in ſuch cumberſome Goods as Hemp is; but alſo are ſituated in the Neighbourhood of good Soil. Indeed *Dunkittle* is the remoteſt, yet might it be very well ſupplyed with Hemp; if the People that live on the *Black-water* were induſtrious to raiſe it, and bring it by Water to *Youghal*, thence it may be boated to *Dunkittle* with Eaſe.

Quantities of Hemp.

SECT.

SECT. III.

Of Plowing for Hemp in Holland.

Plowing.
Wetneſs & Depth of their Soil.
Land poachy.
Digging the Land.
Harrowing.

THEY plow in *Holland*, eſpecially in *Targou* or *Gauda*, in a Manner vaſtly different from ours; occaſioned (as I conceive) by the Wetneſs and Depth of their Soil. They plow their Leys in *Auguſt*, and ſo let them lye till *April*, that their Grounds may be hard enough to bear their Horſes; which does not always happen, for ſometimes their Land is ſo poachy, that Horſes cannot ſtand thereon; then are they forced to dig it: But in caſe their Horſes can ſtand, they harrow it acroſs with heavy Iron Harrows in *April*, which break the Sods with great Eaſe; they having lain from *Auguſt* to *April*, that they become rotten.

Plowing their Leys,
Richneſs of the Soil.

When they plow their Leys, they ſeldom go deeper than four Inches, which cut the Turff or Sods ſo thin, that it ſoon rots; beſides, the Soil is ſo rich, and the Froſt ſo conſtant in the Winter, that their Land is ſoon mellow'd, and yields to their Harrows without Obſtruction: Theſe Harrows cleanſe their Grounds from all Rubbiſh and Filth: Then do they fall to Plowing their Ley-grounds, with as deep a Furrow as the Nature of their Land will admit of.

Land made mellow.

Plowing their Leys.

The Ridges made for Hemp in *Targou*, are generally from twelve to ſixteen Foot wide: Their Furrows are very narrow and ſhallow, becauſe they have very large Drains, at every ten or twelve Perches further Diſtance, or nearer, as their Grounds are more or leſs wet.

Ridges.

In *Utrecht*, the Lands are a ſtiffer Clay than in *Targou*; they make their Ridges thirty or forty Foot wide, their Furrows deeper; they raiſe there a very good Hemp, and great Quantities of it; they have likewiſe large Drains, but not ſo cloſe together; the Grounds about *Utrecht*, not being ſo marſhy and wet as in *Targou*.

Targou.

Marſhy and wet Grounds.

SECT. IV.

The Author's Opinion, what Culture might be moſt proper for Lands in Ireland.

Soil deep and rich.

Narrow Ridges.

IF the Soil be deep and rich, with a good Bottom, diſtant from hard Gravels, Quarries, or blue Clay, (any of which would hold the Water) ſuch Lands need no more Plowing and Harrowing, than juſt to bring them to be mellow and clean, the Mold made as fine as poſſible, and the Ridges laid as flat as the Top, as they are in *Holland*. I approve of Mr. *Slator*'s making his Ridges narrow, for the Conveniency of pulling the Fimble-hemp, becauſe the Labourers in *Ireland*, are not ſo expert as yet, at the pulling of Hemp, as the Boors in *Holland* are: And I likewiſe approve of his Directions, as to the making of the Furrows and Drains for carrying off the Water.

Places where the Soil is good and proper for Hemp.

There are many Places where the Soil is good and proper for Hemp, were it not too thin; Quarries of Stone, or a hard Gravel, or ſtiff Clay, lying too near the Surface of the Earth; a careful Husbandman might gather this Soil by his Plow, and double, or more, the Depth of it. Theſe Grounds well harrowed, and laid flat at Top, will bring as good a Crop of Hemp as the other.

Loamy and Clay Grounds require to be thrice plowed, well broke with Iron Harrows; the Crop will ſcarce be as good as the former; the Furrows ſhould be deep, and the Ridges pretty high, then the Husbandman may expect a Crop which may ſufficiently reward his Labour.

Loamy and Clay Grounds.

Furrows.

Ridges.

SECT. V.

Of Pulling and Watering of HEMP.

THE Fimble-hemp is the firſt ripe: The Way to know when it is ſo, is by obſerving when the Leaves turn yellow towards the Roots; and alſo, if, by touching the Stalk of the Fimble-hemp with a Stick in the Morning, you perceive a Duſt, and that the Bloſſom falls eaſily off, then is it fit for pulling: But theſe ſigns will not appear in all the Fimble-hemp at

Fimble Hemp.

To know when it is ripe.

at one and the ſame Time; for the ſhort Fimble is ſooner ripe than the long Fimble; yet Care muſt be taken not to leave the long Fimble-hemp unpulled, after you perceive the other ripe; for if you ſhould let it grow too long a Time, after the above Obſervations appear, the ſhort Fimble will be over ripe, and be of no Uſe.

Short Fimble.

In *Holland*, they pull the long Fimble-hemp ſeparately and apart from the ſhort; eſpecially, ſuch as they perceive to have ſhed its Leaves and Bloſſoms, becauſe the ſhort Fimble is longer Time a rating than the long Fimble is: They are ſo careful not to break or bruiſe the Carl-hemp, as they pull the other, that when they pull their Fimble, they are forced to take off their Coats and Shoes, and tuck the Skirts of their Veſts within their Breeches, and alſo have the Sleeves of their Veſts made ſo tight to their Arms, as none of their Cloaths might break or bruiſe the Carl-hemp: And tho' their Ridges be ſo very wide, that they are forced to walk through the Hemp, yet will they not break any Part of it.

Pulling the long Fimble-hemp.

Ridges wide.

When they have pull'd a large Handful of either Sort of the Fimble-hemp, then do they bind them with two Bands, one at a ſmall Diſtance from the Top, and the other towards the Butts, and let it lie three or four Days in the Air, to ſtiffen; after which they take thirty or forty of theſe ſmall Sheaves, and place them on the Butts, with the Heads leaning on each other; ſo by drawing the Butts of the Sheaves out, they leave the Pile as round and hollow within, as poſſibly they can; by which Means the Air paſſes readily through the Hemp, as it ſtands; thus they leave it till it is thoroughly dry, and the Stalks turned yellow; they then fall to binding of their Hemp in larger Sheaves, about three Foot in Circumference, and on each Sheaf they bind three Bands, *viz*. one in the Middle, and one towards each End; by which Means, each Sheaf is made exceeding tight, and ſo proceed to rate it.

Binding the Fimble-hemp.

The *Dutch* always rate both their Flax and Hemp in their Drains, which are always large enough to receive their Hemp, in any Manner they are pleaſed to lay it. The firſt Range is laid long-ways, which they ſtitch together with coarſe Line, Sheaf by Sheaf, the whole Breadth of their Drain, to

the

the end that the Sheaves may not ſeparate from each other in the Water, and ſerve as a Foundation for ſuch other Hemp as they deſign to lay over it. Their Manner of ſtitching their Sheaves together is thus: They firſt conſider how many Foot wide their Drain is: In the next Place, they conſider how many Sheaves, laid Side by Side each other, will fill that Space; ſo many Sheaves do they accordingly lay, and ſtitch them to each other at both Ends, and in the Middle, with Lines which they have for that Purpoſe; then they ſhove into the Water that Parcel, and on the Surface of the Water they place it in the Manner they deſign it ſhall lie, when ſunk: Then they proceed to make another in like Form, and ſhove that alſo into the Water, and range it ſo as it lies, at the End of the other. They afterwards make as many of theſe, and place them according to the Length they deſign to make their Pile of Hemp: That done, they begin and lay other Sheaves acroſs one End of the former, and continue ſo to lay Sheaf by Sheaf, till they have quite covered the Sheaves firſt laid in the Water: Then do they pile up their Hemp of one Sort, till they come within twelve Inches of the Surface of the Water, when the Pile is ſunk. The *Dutch* are forced to ſink both Hemp and Flax when they rate them, by covering them with Mudd-ſods, and ſuch ponderous Things as they can get; Stones not being to be procured in thoſe Countries. When this Pile is ſunk of the ſhort Fimble-hemp, they then apply themſelves to the making of another Pile for their long Fimble-hemp: This is made exactly in the ſame Manner with the former.

When the Hemp has been in Water about four Days, they thruſt their Arms down as far as they can reach, and at firſt draw out a Handful out of the ſhort Fimble-hemp, which they rinſe in the Water, and ſet it on the Butt, leaning on the Horſe or Frame herein after deſcribed; and when it is dry, they try whether the Harl will eaſily quitt the Bunn; if it does not, they repeat theſe Trials twice a Day, until they find that it will do; and then do they heave it Sheaf by Sheaf from of the Pile, rinſing each Sheaf from the Slime and Filth which clings to the outſide of the Sheaf; that done, they immediately take off the Bands which were tied about the large Sheaves, and likewiſe thoſe Bands at the Butt-end, tied in the Field at the Pulling; and then ſet up theſe ſmall Bundles againſt the Frame or Horſe, in the Manner you ſee herein below deſcribed, and there let it ſtand till it is perfectly dry, at which Time they bind it at each End, into Sheaves of what Size they pleaſe, and houſe it carefully. The long Fimble-hemp muſt be treated exactly as the former, and kept apart.

In *Ireland*, we cannot have the Opportunities of theſe Drains, which are ſo frequent in *Holland*; therefore, where we cannot have Loughs or Lakes, or other ſtill Waters, we muſt have Recourſe to Ponds made for that Purpoſe. I do not diſlike Mr. *Slator*'s Manner of making his Ponds, from any Experience I have of Inconveniencies which might attend them: Yet I ſhould think, if they were made wide enough to receive at leaſt one Sheaf athwart the Pond, if not more, for the better piling of it under the Water. I ſhould think it were ſo much the better; for in my Opinion, the *Dutch* have ſome Reaſon why they lay their Sheaves acroſs each other in the Ranges, alternately, and not lay it always one Way, as they muſt of courſe do, if the Ponds are to be but four Foot and

Loughs.

Ponds.

and a Half wide. It is certain, the Sheaves lie cloſer when they are all laid in the ſame Manner, than when they are placed as the *Dutch* place them; and conſequently, the Water has a freer Acceſs, which may be of more Importance to the proper rating of Hemp, than at firſt Sight appears. As to the Depth of the Ponds, I think Mr. *Slator's* is ſufficient, conſidering the great Expence which muſt attend the making them the ſame Depth the *Dutch* have their Drains; beſides the Hazard of meeting with Rocks, which they in *Holland* are in no Danger of.

Depth of the Ponds

Ponds ſhould be made in ſtiff Clay, rather than in gravelly Grounds, there being leſs Danger of meeting with Rocks in Clay-grounds than in Gravel: For ſhould a Husbandman happen to light on a Rock or Rocks in ſinking his Pond, he muſt either loſe what Labour he has been at, or be at the Expence and Trouble of bringing the Bottom to a Level, and alſo to a Face fit to receive Flax or Hemp: For if the Points or ſharp Edges of Rocks lie near to the Harl of Flax or Hemp, whether on the Sides or in the Bottom, they will cut the Harl as far as they

Ponds ſhould be made in ſtiff Clay.

Edges of Rocks.

they reach; beſides, Clay-water is generally preſerved more ſoft than in Gravelly Grounds: For theſe Reaſons, I prefer Clay to Gravel.

But Mr. *Slator* is much in the Right, in Gravelly Grounds. preferring Gravelly Grounds to Grounds compoſed of looſe Earth, or boggy Soils, for making the Ponds in; for to be ſure, theſe looſe Grounds will be always falling in, and not only foul the Water, but be apt to let the Water go: I ſcarce think, that Ponds made in ſuch Sorts of Soils as theſe, will ever turn to account; for flag them or plank them, it would be all one; the Water will waſh under and behind them, and it muſt be an immenſe Charge to keep them in Repair.

Houſing Hemp. The *Dutch* always houſe their Hemp after it is rated, becauſe their Quantity is not ſo great, but that they can afford it Houſe-room: And they have been in the Enjoyment of this Husbandry for ſo many ſucceſſive Ages, and their Profits ſo great thereby, that it is not a Matter of Wonder that they are ſupplied with every thing requiſite thereto: Whereas our People of *Ireland* are Novices therein, and, as it were, making Eſſays to ſee, firſt, whether

ther the Thing is practicable: Secondly, whether it is worth their Time. It is to be hoped, that ſome are convinced of both, yet it is evident, that many are not; and until this Sort of Husbandry be more generally known in thoſe Parts of the Kingdom proper for raiſing Hemp, and alſo practiſed, the Profits will be in particular Hands, who will not launch out their Money in the making of Barns, and other Improvements proper for this Culture, in which they have had hitherto ſo little Experience.

However, Mr. *Slator* has very juſtly ſtated the Conveniencies and Inconveniencies attending the preſent Practice in *Ireland*, by the Want of convenient Barns. I ſhall conclude this *Section* with this general Apology in my own behalf, for being ſo large in my Obſervations and Remarks through this Syſtem of flaxen and hempen Agriculture, That I conceive it to be ſo much my Duty, fully to inform all Perſons engaged, or to be engaged in this important Matter, that I ſubmit rather to be cenſured as prolix than deficient.

SECT. VI.

Of Breaking of Hemp.

Breaking of Hemp.

THE *Dutch* uſe a Method in breaking of their Hemp, early practiſed in *England*, that I know of, which is thus: They make a very large Kiln, ſometimes built with Brick, but more frequently with Sods; which Kiln is made about five Foot high, ten Foot long, and eight Foot wide, flat at Top; over which, croſs Pieces of Sticks are laid, which are wattled thin: On this they lay their Hemp in the ſmall Bundles they were at firſt tied in the Field, then with the Hurds or broken Straw of the Hemp, or ſome ſuch combuſtible Matter, they dry it well, and afterwards take it thence, and cover it cloſe about three Hours, there to ſweat: Then they proceed to break it, in Breaks made much like ours, ſave only they are not ſo deep maſhed. In the breaking, they begin at the Tops of the Hemp, and work it downwards till the Shoves are ſufficiently wrought out; and they never ſwingle Hemp in *Holland*.

A large Kiln.

Drying Hemp.

They never ſwingle Hemp in *Holland*.

When they have wrought to the Butts or Roots, they turn the Butt-end the other Way to break it; and if all the Butts do not readily break, they have a blunt Knife lying by them, wherewith they ſcrape ſuch of the Roots and Butts, as the Breaks did not effectually divide the Harl from the Bunn, until the Harl and Bunn are well ſeparated: This Scraping they perform acroſs their Knee, as frequently as requiſite.

The Pulling of the long Fimble-hemp apart from the ſhort, is not only neceſſary with regard to the Watering, but alſo of abſolute Neceſſity in the working of them; for ſhould the long Fimble-hemp be broke, and hackled promiſcuouſly with the ſhort, it would occaſion vaſt Waſte; for the Artiſt always holds the Roots in his Hands, as evenly as he can. When he breaks or hackles, he muſt work the whole Hemp equally down to the Roots; and if they be of a very unequal Length, the Tops of the long Fimble will be over wrought, and rendered uſeleſs, if any of them ſhould happen to remain.

Mr. *Slator* has given the proper Reaſons againſt graſſing of Hemp, therefore I ſhall take no Notice of that here.

They have in *Holland* about a Guilder *per* Hundred for breaking of Hemp, which is two Shillings *Engliſh*.

SECT. VII.

Of Pulling and Saving the Carl-hemp.

Carl-hemp ripe.

THE People in *Holland* who are beſt skill'd in raiſing of Hemp, determine their Carl-hemp to be ripe and fit for pulling, by the following Methods. Firſt, they obſerve whether any of the Seed begins to appear, and has burſt the little Cell, or Seed-bed that Nature has provided for it. Secondly, whether thoſe Seeds ſo appearing, have the Kernel of them perfectly formed, or whether it be ſoft and like a Jelly; if ſo be that it is ſoft, they allow it to ſtand longer to ripen; but if the greater Part of the Seeds be hard and well filled, they do not defer pulling of it longer: And their Method of pulling the Carl, is the ſame with that of the Fimble in every Reſpect; eſpecially pulling the long Carl apart from the ſhort, and binding them in ſmall different Bundles, *viz.* as much as a Man can well hold in his Hands.

Pulling the long Carl apart from the ſhort.

Theſe

Bundles of Hemp.

Theſe ſmall Bundles of Hemp being bound at each End, as the Fimble-hemp was, they raiſe up upon the Butts, on each Side of the Frame or Horſe formerly deſcribed: They make theſe Frames or Horſes with any Rubbiſh of Wood they can get; they are far from being coſtly, tho' they have many of them; becauſe they in the drying of their Hemp, are ſo very careful, as not to dry their long Carl-hemp at the ſame Frame with their Short, leſt the long might ſhade the ſhort, or elſe over-top them, and prevent their drying: Sometimes they venture to put three or four Sheaves, one over the other, as they ſtand leaning on the Frame; but if they do ſo, they are ſure to remove them, and turn them after ſuch a Manner, as that all the ſmall Sheaves may be equally weathered; thus do they let it ſtand till the Leaves are perfectly dry, and the Seed ready to ſhed.

Sheets or Win-now-cloths.

They then provide Sheets or Win-now-cloths, and ſpread them in ſome convenient Place in the Field, and thereon lay two Pieces of Timber, about eight Inches ſquare and ten Foot long; theſe Pieces of Timber are placed juſt oppoſite each other, at five Foot Diſtance; over which they lay the Tops of the Hemp hanging: About a Foot beyond the Timber two Men ſtand, within the Winnow-cloth or Sheet, and with Flails thraſh out the Seed, as the Sheaves hang over; and at the Butt-end of each Sheaf ſtands a Woman, who conſtantly turns the Sheaves, ſtill as the Seed is beat out. When the Sheets begin to fill with Seed, Women come and take it thence to riddle it; which they do through a wide meſhed Riddle, and ſever the Seed from the Leaves, Stalks, and groſſer Part of the Filth, which was before mixed with it. Yet, as to the Duſt and Chaff which paſſed through the Riddle along with the Seed, they leave that to remain with the Seed, until ſuch time as the Seed is compleatly dry; becauſe it is their Opinion, that this Duſt and Chaff prevents the heating of the Seed as it lies drying.

Flails.

Riddle the Seed.

When the Seed is thus thraſh'd out of their Hemp, they convey it to a well boarded Floor, where it is laid much in the ſame Manner as Maltſters lay their Couch of Malt, about two or three Inches thick; and they turn it once a Day

Thraſhing the Seed out.

Day regularly, during the firſt three Weeks, not ſuffering the Man who turns it, to have either Shoes or Pumps on, leſt he ſhould break or bruiſe the Seed by treading on it. About three Weeks afterwards, they clean their Seed again, but not entirely from the Chaff or Duſt: For the former Reaſon, they continue the Seed ſtill on the boarded Floor, and obſerve to turn it twice a Week, till the Seaſon comes for ſowing it.

What the Seed is ſold for in *Holland.*

Hemp-ſeed is generally ſold in *Holland* at eight *Guilders per* Hogſhead, which is ſixteen Shillings *Engliſh* Money: Their Hogſheads ought to hold ſeven Buſhels of their Meaſure; each of their Buſhels being an eighth Part leſs than our *Wincheſter* Buſhel. The *Dutch* are a very frugal People, yet I think Mr. *Slator*'s Method of thraſhing out his Seed, is much more ſaving than theirs; for when Hemp is dry, it is very apt to ſhed its Seed, great Part of which muſt be loſt, by removing it Sheaf by Sheaf to the Place where it is thraſh'd; and there are in *Holland* many more Hands leſs uſefully employ'd, by thraſhing out the Seed in their Manner than in his: Therefore as it was my Duty, not only to obſerve their Practice, but likewiſe to diſplay to the Publick (in Obedience to the Commands of my Employers) the beſt Practice, according to the beſt of my Judgment, without copying the *Dutch* beyond Reaſon.

SECT. VIII.

Of Dreſſing or Peeling of Carl-hemp.

Peeling of Carl-hemp.

THE *Dutch* never break their Carl-hemp with Breaks, leſt the Bunn ſhould cut the Harl; they therefore peel it in the following Manner; that is to ſay, they break with their Fingers, the Bunn or Straw of the Hemp, about ſix Inches from the Top or ſmaller End of it; then they bruiſe the Stalk or Straw of it between their Thumb and Fingers, down to the Butt or Roots; which cauſes the Harl or Skin to ſplit, ſo as the Bunn is eaſily taken out: They afterwards clear the Tops that they have broken off from the Bunn; then hang the Harl on a Chair Back, or a Pin ſet up for that Purpoſe, till they have gathered about a Pound or two of Harl; and keeping the Butt-ends of their Hemp all together, as even as they can, they lap the the laſt mentioned Harls up in Bundles, and lay it by. Yet all this While they never mingle their long Carl with their ſhort, but conſtantly work them apart.

They keep the Butt-ends of their Hemp all together.

They never mingle their long Carl with the ſhort.

Their Time for peeling the Carl-hemp is, either during the long Winter Nights, or ſuch wet Days, as they cannot work abroad in the Fields. This is the merrieſt Time in the Year for the Boors; for then it is, hat the Neighbours make their Viſits to each ther, and aſſiſt to peel the Hemp. The Man of the Houſe then treats his Neigh- ours in a very commendable, friendly, yet rugal Manner; he lays Pipes and Tobacco efore them; the Frow brings in a Slice of ye-bread, exceedingly thin ſpread with utter, and a thin Slice of Wheat-bread, no- hing better furniſhed with Butter than the rmer; between theſe two Pieces of Bread nd Butter, is placed a Piece of Cheeſe, ſo xceedingly thin, that ten of them would arce make an Inch; theſe are delivered to very one of the Gueſts, which they eat with

The Time for peeling their Carl-hemp.

with great Comfort, and waſh down with a Draught of their brown Beer, much like to our ſix Shilling Beer, in point of Strength; then, in order to warm their Stomachs, they have a Viol of Geneva, which they call a *Bubblekee*, and holds about half a Pint; this Viol is contrived to be ſo narrow at the Throat, as that the Geneva can't come out more than Drop by Drop; and a Man muſt be exceedingly well breath'd, that can ſuck thence more than half a Spoonful at one Pull; for it is not cuſtomary to take a ſecond Pull at it, and the *Dutch* are ſtrict Obſervers of their own Cuſtoms and Manner of living, ſo that after one Man has had his Pull at the *Bubblekee*, he muſt in good Manners deliver it over to his Neighbour, and ſo it goes round.

I have made this Digreſſion, without Deſign of reflecting in the leaſt on the *Dutch* for their Frugality; but on the contrary, to ſhew my Countrymen how the *Dutch* have acquired, and do ſtill acquire, that vaſt Wealth of which they are Maſters. I have in part given them a Specimen of their Induſtry, and now an Inſtance of their Frugality and Abſtinence; and with Concern I ſpeak it, were theſe merry Meetings made at *Engliſh* or *Iriſh* Houſes, the Mutton, the Poultry, and the Bacon, as well as the Beer, Ale, and Brandy muſt have paid the Shot: Beſides, the Miſtreſs and her Family muſt have been diverted, each of them from their Houſhold Affairs, to attend the Affairs of the Kitchen and Pantry.

In *Muſcovy* and other Parts of the Eaſtland Countries, where they raiſe vaſt Quantities of Hemp, they have Windmills, or Water-mills ſo contrived, with Rollers one after another, as they can break the Hemp with Safety, and with ſuch Diſpatch, as to afford the doing it at ſixteen Pence *per* Hundred. In thoſe Countries where theſe Mills are, they have the Conveniency of Water-carriage, by the Means of their Canals and navigable Rivers. It is true, we have no Canals, but we come no ways behind them with reſpect to navigable Rivers. If the Publick is diſpoſed to have ſuch a Mill made, I dare venture to direct the making of it exactly.

Quantities of Hemp raiſed.

Breaking the Hemp.

Water-carriage.

Navigable Rivers.

Foreign Countries are very careful to promote their Manufactures, by the Help of Engines that diſpatch more Buſineſs, and frequently better than many

Engines.

Hands can perform; by which Means they always under-ſell us in foreign Markets. We may eaſily in *Ireland* arrive at ſuch a Degree of Perfection, as to furniſh *Great Britain*, our ſelves, and the foreign Plantations with Sail-canvaſs and Cordage; which ought to be vended as cheap as our Neighbours can afford them: But if ever we expect to have Share of Trade in foreign Markets, it muſt be by exceeding them in point of Goodneſs, and by ſelling at Rates as reaſonable; theſe can never be compaſſed, but by acquiring the beſt Engines proper for Trade, that are uſed any where with Succeſs; or by contriving at home, others equally good.

SECT. IX.

To what Uſes the Dutch *convert their Fimble-hemp, and Carl-hemp.*

THE Fimble-hemp is in *Holland*, for the moſt part, employed to the making of Sail-cloth, they ſeldom making hempen Linnen; it is ſold there generally, from two and twenty to thirty Shillings *per* Hundred.

The larger Carl they generally work into white Cordage; ſometimes they mix their own with the *Riga* and Eaſt-land Hemps, wherewith they make Cables; but generally ſpeaking, they make their large Cables of *Riga* Hemp, the *Dutch* themſelves being of Opinion, that their own Hemp would contract, or draw up in the Salt-water, ſhould any of the large Carl-hemp be employ'd to the making of Cables. This long Carl ſells in *Holland*, from fourteen to twenty Shillings *per* Hundred.

What the long Carl-hemp ſells for in *Holland.*

The ſhort Carl is beaten in Hemp-mills.

The ſhort Carl, they cauſe it to be beaten well in their Hemp-mills, and afterwards hackled, for making of Twine for Fiſhing-nets, or for the Sail-makers Thread, wherewith they ſow the Sails. Pack-threads and Shop-threads are made with the Tow or Hurds of the ſhort Carl, which laſt mentioned Hemp ſells generally in *Holland*, from two and twenty to five and twenty Shillings *per* Hundred.

The *Dutch* never make Sail-cloth of either of their Carl-hemps; and we in *Ireland* have endeavoured to make a Tryal, how far we could work up their Carl-hemps in Sail-cloth, but we could not make it do, any more than they. Tho' we make tolerable Sail-cloth with the Carl-hemp which grows in this Kingdom, yet I am very ſure, that the Facturies for Sail-cloth in *Ireland*, would find more their Account in making all their Sail-cloth of Fimble-hemp; becauſe it is much more eaſie to bring this to Colour, than they can poſſibly bring the other.

SECT. X.

Of Hemp-Mills.

Hemp-mills.

IT is ſcarce poſſible to keep a Sail-cloth Factury, without Hemp-mills to beat their Hemp: There are four of theſe Mills erected in *Ireland*, at the Expence of the Publick, exactly in Imitation of the *Dutch*; but theſe are found too coſtly for private Undertakings. In *England*, they have found out a Way of making their ordinary Corn-mills, with a very ſmall Expence, in compariſon of the other, to anſwer all the Ends and Purpoſes of Hemp-mills: It is thus, They make the Beam of the Mill-wheel ſo much longer than uſual, and place the Cogs they deſign

Corn-mills.

deſign to employ in the Hemp-mill, in proportion to the Number of Beaters they have Occaſion for. Any Mill-wright that has once ſeen a Hemp-mill, and conſider'd it, may ſoon make a Corn-mill to perform this Office. The *Dutch* beat their Hemp in their Mills after this Manner, they take about two Pound of their Hemp, which they turn over at the Middle, they then fold down the two Ends, and tuck them into the firſt Fold, as cloſe to the Head as is requiſite to make the Truſs of Hemp, very near the Length of the Trough, and the Breadth of the Beater or Stamper: Theſe Beaters or Stampers are raiſed by the Cogs fix'd in the Mill-wheel Beam, and the Beaters being made of large weighty Timber, come down with great Force and Violence, and are ſo contrived, to turn the Hemp in the Troughs, each Stroke they give it: When the Hemp begins to be warm with beating, they take that Bundle or Truſs out, and put in another, and while that is beating, they open the former Truſs, give it a Shake, and adjuſt the Butts as evenly as they can, and ſo truſs it again, and lay it on the Bench by them, made for that Purpoſe; by this time, the

The Beaters ſo contrived to turn the Hemp in the Troughs.

the ſecond Truſs is ſufficiently hot, which they therefore take out, and ſupply with a third: They manage the ſecond as they did the firſt, and lay it on the ſame Bench, in Courſe and Order as it was beaten; ſo they proceed, till they have beaten as many Truſſes, as the Miller judges will hold beating alternatively, ſo as the firſt Truſs may be cold enough to be beaten a ſecond Time: Then they proceed to beat and manage the Truſſes, one after another, in the Order and Courſe they were laid, and in the ſame Manner exactly with the firſt. Theſe Beatings muſt be repeated, until the Hemp is ſoft enough to be ſpun.

The Hemp-millers a Trade in *Holland*.

In *Holland*, the Hemp-millers is a Trade of it ſelf, and requires much Judgment and Experience, to know to what Degree of Heat the Hemp may with Safety be beaten, without firing or diſcolouring it: You ought alſo to know when it is ſoft enough for the Spinners:

A good Miller of Hemp ought to be handy in the Repair of his Mill.

And a good Miller of Hemp ought to be handy in the Repair of his Mill, whenever there is Occaſion, elſe the whole Factury may be kept idle, and the Employer at great Expence for dead Wages. The Miller, to gether with the Owner or Occupier of the Mill, have in *Holland* eight Stivers *per Cent.* for each Hundred of Hemp they beat and truſs, which is about ten Pence *Iriſh*, and is two Pence leſs than what is at preſent paid in *Ireland*: This may be thought an inconſiderable Difference in Trade, but they who conſider Manufactures rightly, muſt endeavour to ſave the minuteſt Part of all Fractions, on every Bolt or Piece of Canvas they make, elſe theſe Fractions in a bulky Trade, may be a great Loſs to the Nation. I have never obſerved the *Dutch* to loſe in the beating or hackling of their Fimble-hemp, more than ten Pounds in five Score; ſometimes, nay very often, their Loſs is leſs: I fear it is much greater in *reland*: I am ſure it was ſo when I was cerned at *Dunkittle* near *Cork*, before I went o *Holland*. Since my Return, I have not had either Leiſure or Opportunity to be informed how that Matter is; for if the Loſs e greater here than in *Holland*, it may proceed from many Reaſons, as well from the Nature and ill Management of the Hemp, s from the Faults in beating and hackng.

SECT.

SECT. XI.

Hackling Hemp for Sail-cloth.

Hackles.

THE Hackles which the *Dutch* make Uſe of for hempen Sail-cloth, are much finer than thoſe imployed to the ſame Purpoſe in *Ireland*; on their coarſeſt Hackle, they make their firſt Hackling, and dreſs the Butts, and other the coarſeſt Part of the Hemp, to be of equal Fineneſs with the reſt, they finiſh on a Hackle as fine as thoſe which came from *Coventry*, called Number four; by which Means they dreſs their Hemp of equal Fineneſs to the Flax, wherewith Yarn of two Dozen in the Pound Statute Reel, and Count, is uſually made in *Ireland*: They hackle their Tow or Hurds as free from Knots as may be, and place them in the Inſide of the Tare: This Tow or Hurds will never ſpin well, if it be knotted; and it is of them that the Woft-yarn is always ſpun.

Hackling Tow.

Hemp for Sail-canvas muſt be hackled very fine.

Hemp for Sail-canvas muſt b hackled very fine, elſe the warpin Yarn, which is always made of Tare will not be ſufficiently plyant, an yiel yield to the Slay in the beating up of the Woof, be the Slay-board never ſo weighty. The Warp-yarn for Canvas muſt be both ſtrong and plyant, to prevent the Yarn's breaking, which compoſes the Warp, which otherwiſe would be attended with many Inconveniencies: As, in the firſt Place, many Knots ſpoil the Skin of the Canvas; to conceal which, the Weavers, as they weave, cut theſe Knots as cloſe to the Skin of the Cloth, as they can: By which Means, as ſoon as the Canvas is ſtrain'd by the Wind, it runs into Holes immediately. In the next Place, it occaſions great Delay to the Weaver: But that which is the worſt of all, is, that in caſe the Warp be not plyant, the Woof can never be cloſe enough beded, admitting it to be three Stroke Work, which is what is generally given to Sail-canvas; and if the Woof be not cloſe beded, the Canvas will draw a Wind, and prevent the Ship from lying by the Wind, when there is Occaſion.

Hackling Tare fine.

The Hackling the Tare fine, muſt of Neceſſity make more Tow and Hurds, than otherwiſe; but that is no Loſs to any Body, becauſe the Tow or Hurds are always ſpun into Woof-yarn, which is equally valuable with the former, when wove into Canvas.

The Tow or Hurds which are taken off the Butt-ends, and coarſeſt Part of the Hemp, in the Dreſſing, the *Dutch* never ſuffer to be wrought into Canvas, but apply theſe laſt Sort of Hurds to the making of Bed-cords, or Cords made uſe of in Packing.

A Hundred of good Hemp produces in *Holland*, from 42 to 48 Pd. of good Tare.

Each Hundred of good Hemp produces in *Holland*, from 42 to 48 Pounds of good Tare. The Hackler has five Stivers (which is Sixpence *English* Money) for every twelve Pounds of clean hackled Hemp, which is near one half cheaper, than it is done in *Ireland*; and conſequently a heavy Clogg on our Trade. I cannot ſee any Remedy thereto, but by encreaſing the Number of Hacklers and Swinglers, from all Parts of the World where they can be had, and by inſtructing the Natives of the Country, to be ſufficiently skill'd therein; for each of theſe Artiſts are exceedingly requiſite to this Kingdom, both of them neceſſary to the breaking, ſwingling, and hackling of Flax, and alſo requiſite to the breaking and hackling of Hemp, allowing the People here ſhould conform to the *Dutch*, and never ſwingle Hemp.

SECT. XII.

Of Spinning Hemp for Sail-canvas.

The Uſe of the Wheel, for ſpinning of Warp-yarn for Sail-canvas.

THE Wheels which they make Uſe of in *Holland*, wherewith they ſpin the Warp-yarn for Sail-canvas, are much the ſame with thoſe commonly uſed in the *Iriſh* Factories; yet the *Dutch* are more careful in the proportioning of their Whirl, Spool, and Flyers to their Wheel, and alſo in making the Whirl, the Spool, and the Flyers, conform to each other; vithout which it is difficult for the Spinners o make the Thread equal, and the Twiſt o be neither more nor leſs than it ought; or thereon depends the making good Sail-loth: For if it be over twiſted, it will neer be plyant, which is ſo great a Requiſite, hat without it, it is impoſſible to make a ood Cloth, for the Reaſons already given. nd on the other Hand, if it be underviſted, the Warp will be weak, and the

Woof ſtart into Holes immediately. I could never yet ſee a Wheel-wright that could determine what the exact Proportions of theſe Things ought to be, with regard to each other, ſo as they might be reduced to ſome Certainty, by Geometrical Rules in Mechaniſm. It is certain, that each Wheel-wright has ſome Rule by which he makes his Wheels and Tackle; but either he cannot or he will not make that Matter intelligible to others, ſo as a good Mechanick-head might bring this Machine under ſome certain Regulations: For my Part, it is a Province I dare not undertake; for ſhould I be guilty of the leaſt Miſtake, the Errors might be attended with very ill Conſequences.

In the fixing the Tare to the Spinner's Waſte, the *Dutch* always have an Apron on, they place the Harl equally before them at the Waſte, lapping the two Ends between their Body and the Apron-ſtrings, and draw the Thread from their Waſte into a ſmall Hole that is made for that Purpoſe, at the End of the Spool. They always ſpin their Warp in this Manner, becauſe it twiſts leſs, and they find they can diſpatch more Work that

The Manner of ſpinning their Warp.

Way. A good Spinner in *Holland*, can, with Eaſe, ſpin from nine to twelve Pounds of Tare in a Day.

The Woof is always ſpun on Wheels.

The Woof is all ſpun on Wheels like to thoſe which we call here in *Ireland*, long Wheels: This they likewiſe ſpin from the Waſte, and is performed in the ſame Manner as the white Cord-makers ſpin their Yarn, of which they make their Ropes; the Spinner going back to a proper Diſtance, while another turns the Wheel: And when he has gone as far back in ſpinning as is proper, he there ſtops a very little Time, and then advances, till the Thread he has ſpun, be wound up: By this Means, the Woof has a ſofter Twiſt than the Warp. A good Hemp-ſpinner will ſpin from fifteen to eighteen Pounds a Day, of Woof-yarn. The Price for ſpinning of Warp, is there eighteen Stivers *per* Dozen, which is between one and twenty and two and twenty Pence *Engliſh*. The Price for ſpinning of Woof-yarn is fifteen Stivers *per* Dozen. A good Spinner will ſpin a Dozen and a Half of Woof-yarn in a Day. I know not what Wages is now given at the Facturies, for ſpinning of Warp and

The Price for ſpinning of Warp.

The Price for ſpinning of Woof-yarn.

and Woof for Sail-cloth; but if a Man may be allowed to form a Judgment of ſpinning of Hemp, by the proportionable Hire given generally to Spinners, for ſpinning of Flax, it will be found, that Hemp-ſpinning might be afforded in *Ireland*, vaſtly cheaper than in *Holland*: For if two Pence a Hank be in *Ireland*, thought good Wages for ſpinning of flaxen Yarn, of two Dozen in the Pound, Statute Reel and Count; and, generally ſpeaking, the Flax-ſpinners do not ſpin more than a Hank and a half, one Day with another, of Yarn of that Set, whereby the Spinner earns three Pence a Day: How comes it to paſs, that the Hemp-ſpinner ſhould be allowed to earn one and twenty Pence a Day, on Warp, and ſeven and twenty Pence a Day, by ſpinning of Woof? The Difficulty is ſoon ſolved. There are in *Ireland*, two thouſand Flax-ſpinners, for one Hemp-ſpinner; and if I have Flax to ſpin, the Spinners being many, court my Work: If I have Hemp to ſpin, the Spinners are few, and I muſt court them. Therefore, to diffuſe this Art of ſpinning of Hemp, and make it more general, it were adviſable, that all the poorer Sort of People thoroughout the whole Province of

Munſter, and ſuch Parts of *Connaught* and *Leinſter*, as have the Conveniency of the *Shannon*, the *Barrow*, and the *Noar*, be taught to ſpin Hemp, both Warp and Woof; that the Owners of the Facturies be obliged to have Agents in proper Places, for the more convenient and eaſy carrying on of this Trade: By this Method, the Facturies will be ſupplied with Spinners, at eaſy and cheap Rates; and, by the Means of Water-carriage, divers other Advantages will accrue to the Publick, which might be now demonſtrated, were I not afraid of treſpaſſing too much on the Reader's Time.

Water-carriage.

SECT. XII.

Of Bleaching Sail-canvas Yarn.

THE *Dutch* bleach their Canvas-yarn with a Boiler, which they call a Tirnine. This Engine is made of Braſs, narrow at the Bottom, and widens gradually as it riſes to the Top: It has a cloſe Cover made of the ſame Metal, in which there are Vent-holes of about three Inches Diameter; over which Holes they place ſmall ſliding Covers, by Means whereof they can give Vent to their Lees, when boiling; for otherwiſe, all would fly as the Heat increaſed: For ſometimes the Lees boil with that Violence, that they will ſhoot through thoſe Vent-holes, ſix or eight Inches high above the Cover: For which Reaſon, the Boiler it ſelf, and the Lid which covers it, are ſo contrived, as to be ſomewhat hollow at the Top, to receive the Lees again as they fall down on the Lid, whence they eaſily paſs down again into the Boiler. They are ſo apprehenſive of the Violence that theſe Lees may poſſibly ariſe with, they have a ſtrong Bar of Iron placed croſs the Funnil, to which another Iron-bar is fixed, that comes down to the Lid of the Boiler, in order to keep the Lid fixed in its Place, till they ſee Occaſion to remove it. Theſe Tirnines can boil about a hundred and twenty Pound Weight of Yarn at a Time; they are fixed in Brick and Lime, exactly in the ſame Manner with our Furnaces, with proper Grates for the Fire; and as near to the Bottom of this Tirnine as they conveniently can, they place a Cock, to let go the Lees, when the Yarn is ſufficiently boiled.

Their Manner of boil-ing their Yarn.

Their Manner of boiling their Yarn is thus: They take about ten Pound Weight of the Hanks of Yarn, and lap each Hank over the other, round like a Ball; they have ten of theſe Balls lying by them: They then fill their Tirnine three Quarters full of cold Water, then make their Fire under the Tirnine or Boiler, till the Water is Milk-warm. In this Water, they place firſt one Range of the Yarn, lapt up as aforeſaid; they are exceeding careful in the laying their Yarn in the Boiler, leſt it may tangle; and over the Yarn that is firſt laid in the Boiler, they ſtrew about five Pounds of Aſhes, mixed and prepared in the Manner herein after mentioned; then they put in another Layer of Yarn, and ſtraw the like Quantity of Aſhes over it: Thus they proceed in the laying in of their Yarn, conſtantly ſtrewing over each Range five Pounds of Aſhes, till all the Yarn, with its Proportion of Aſhes, is laid in the Tirnine: They are forced to preſs the Yarn hard down, that they may put on the Cover. Thus, at every Boiling, they uſe about ſixty Pound

Weight of Aſhes; they make a ſharp Fire under the Tirnine, ſo as to cauſe the Lees and Yarn to boil for three Hours, as ſharply as they can, opening the Vent-holes gradually as the Heat encreaſes; or rather, as they ſee there is Occaſion for giving it Vent, they will cloſe and open theſe Vent-holes neither more nor leſs, than abſolute Neceſſity requires; ſo deſirous are they to preſerve the Spirit of their Lees from flying away as they boil, that it may remain and do its Office on the Yarn.

The Yarn boiled.

When the Yarn has thus boiled during three Hours, they open the Cock which is placed near the Bottom of the Tirnine, and let go the Lees: After the Lees are gone, they pour cold Water into the Tirnine over the Yarn: The Quantity of cold Water is much the ſame with that which the Yarn was boil'd in, having firſt removed the Fire from under the Tirnine; they then let go this Water at the Cock, and load in freſh cold Water, and as it empties at the Cock, they continue lading in of more Water, till the Yarn is pretty cold, and has done ſmoaking; then is the Yarn carefully taken out of the Tirnine, and opened Hank by Hank, conſtantly throwing cold Water thereon, till all the Hanks which were in the Tirnine, are perfectly cold.

The Yarn being cold.

The Yarn being ſufficiently cold, they firſt rinſe it very well, in fair, cold Water, and afterwards lay as many Hanks on the Batting-plank, as they can conveniently ſpread thereon, and their Batting-ſticks can reach. They never lay their Yarn thicker than two Hanks, while they batt; and their Manner of making of their Batts is, by tying two Sticks together like Flails, but that which comes down on the Yarn, is always made as ſmooth and even, as they poſſibly can get them, leſt the Knots in the Sticks might break the Yarn. While the Yarn is a batting, another Perſon with a Scoop caſts cold Water continu-lly on it: When one Side is ſufficiently batted, they turn up the other, till they ave batted that Side likewiſe in the ſame Manner: They then rinſe it well, and wring it on the Engine hereafter mention-d, till it is freed from the Water. Their ext Care is to put theſe Hanks one by one, n ſmooth Poles which they have for that urpoſe, and ſhake the Yarn very well, and

The *Dutch* Manner of making their Batts.

and ſpread it on the Poles, ſo as none of it may cling together; that done, they lay carefully Poles and all on the Graſs in their Bleach-yard, during three Days and three Nights, turning it every Day in order to bleach it; yet they never ſuffer it to lye longer Time on the Graſs, but afterwards raiſe it with the Poles, on the Horſe prepared for that Purpoſe, where it hangs till it is dry.

That which I here call the Horſe, are ſquare Pieces of Timber, of about ſix Inches ſquare, ten Foot high above the Surface of the Bleach-yard; they are fixed in the Ground at the Edges of the Graſs-plot, pretty deep, that they may ſtand the firmer, and at the Diſtance from each other, in proportion to the Length of the Poles, which generally are between five and ſix Foot long; in theſe Poſts there are Catche fixed on that Side next the Green, an they always put as many of theſe Pegs o Catches one under another, as they conceiv the Horſe can bear, in proportion likewiſe t the Length and Depth of the Hanks and Pol as they hang; taking great Care, that th upper Ranges of the Yarn beat not on th lower, as they are moved by the Air

Wind: On theſe Horſes the Poles are hung, with as much Yarn thinly ſpread, as can well ſtand between each Poſt, and there they let it hang till it is dry.

While the Bleacher was thus managing of the firſt hundred and twenty Pound of Yarn in his Bleach-yard, in order to bring it to Colour, the Boiler or Tirnine does not during that Time ſtand idle, but is filled with a ſecond, and after that with a third, fourth, and fifth Proportion of Yarn, each of them equal to the Quantity firſt boiled; by which Means, they have in a few Days boiled, and prepared ſix Hundred Weight of Yarn fit for bucking.

Before I proceed to deſcribe the Manner of the bucking of their Yarn, it is requiſite that I acquaint my Reader with the many other Conveniences in and about the Bleach-yard, which the *Dutch* are very careful to provide, ſo as nothing may be wanting, that is either neceſſary, or convenient for to compaſs their Ends: For this Reaſon it is, that they have always their Bleach-yards at a Diſtance from any High-ways, or other Places where the Duſt may be raiſed by the Wind, which may drive over their Bleach-yards, and ſully their Work. And to the end nothing offenſive might come into the Bleach-yard, they have a Wall about eight or nine Foot high, built at the Extreams of all the Bleach-yard; under the Shelter of theſe Walls they build Penthouſes, wide enough to ſet their Yarn with the Poles acroſs them, when the Weather is ſo wet or windy, as that it is not convenient to have the Yarn hang abroad on the Horſe; therefore, let the Wind blow from what Point of the Compaſs it will, they are provided againſt any Inconveniencies of Wind or Weather: And leſt the Turf of their Graſs-plot ſhould be either foul'd, or dirtied, or worn out by their Labourers treading on it, more than what is of abſolute Neceſſity, there is always a Walk of ſix Foot wide, between the Penthouſes and the Green, where the Labourers perform all their Labour or Work; excepting only when they ſpread their Yarn on the Green, or when they mow, ſweep, and roll it; for they keep their Green as fine as a Bowling-green, leſt their Yarn be ſtain'd, either by long Graſs or Flowers; this they would infallibly be, if the Green was not kept with the utmoſt Exactneſs.

When they have boiled five times a hundred and twenty Pound Weight, and prepared every Part of the Yarn, ſo as to have ſix Hundred Weight ready for bucking, (counting five Score to each Hundred) then they proceed to buck this ſix Hundred Weight of Yarn altogether, after this Manner:

They have in their Buck-houſe, cloſe to their Tirnine or Boiler, an Engine made in the Form of a Cheſt, of two Inched Plank, about eight Foot long, five Foot wide, and ſix Foot deep; this Cheſt is ſo contrived on the Outſide of it, that the Planks may ſlide up and down and be taken out, for he more convenient filling the Cheſt with he Yarn and Aſhes; and the Joynts are ſo ontrived, as to ſhoot into each other, and o retain the Lees while the Yarn is buckng: In the Bottom of this Cheſt they have oles made by an Augre, ſomewhat larger han an Inch, each Hole a Foot Diſtance om each other; they ſtop theſe Holes with ugs, and when they ſee occaſion to let o the Lees, they take out as many of the ugs as is neceſſary. This Cheſt is placed ittle in the Ground, over a hollow Drain ade with Brick and Lime, after ſuch a

Manner, that all the Lees that come from the Cheſt, paſs thro' a Gutter, (made likewiſe of Brick and Lime) to an open mouth'd Veſſel, placed there on purpoſe to receive it and the other Lees thrown out of the Tirnine each Time they boil: When this Veſſel is full, they empty it into old Hogſheads, after having filter'd or paſs'd them thro' ſpent Aſhes and Straw: TheſeLees ſerve better to boil Yarn in, than fair Water can, and by their paſſing them through ſpent Aſhes and Straw, they are purged from any Filth they contracted in the boiling or bucking, yet do they retain ſome Part of the Strength of the Aſhes.

The Method the *Dutch* uſe in bucking of Yarn.

Their Method of bucking of Yarn is thus: They take twenty Pound of *Zeuda* Aſhes and the like Quantity of Aſhes called *double Depriſe*, with theſe they make a ſtrong Lee; and having placed one Range of their Yarn Hank by Hank, ſo as to cover the Bottom of the Cheſt, in the ſmootheſt Manner they can poſſibly lay it, they gently pour over this Layer or Range of Yarn, as much ſcalding Lees as will wet it quite through; then do they lay another Layer of Yarn, over which they pour Lees as before, and when there is occaſion, they put the Planks into their proper Places, ſtill as the Yarn and Lees riſe higher in the Cheſt, and proceed to range the Yarn Hank by Hank, pouring on of Lees over each Range, till the whole ſix hundred Weight of Yarn be compleatly ſtowed in this Cheſt or Engine, which in *Holland* is called a *Lough-Bank*, whereto they have a Lid or Cover to keep in the Steem, which they are ſo exact to prevent its coming out, that they ſtop up every Crevis in their *Lough-Bank*, and cover it all over very carefully with Cloths, ſo as neither the outward Air, or the inward Steem, ſhould get in or out to obſtruct the bucking.

The Cheſt or Engine, which in *Holland* is called a *Lough-Bank.*

Thus they continue their Yarn, for the Space of twenty four Hours compleat; during which Time they having prepared another Lee, made of *Zeuda*, and *double Depriſe* Aſhes, of each ſeventeen Pound and a half, they let go the former Lees, and ſo pour on the freſh ones, and there let them lye for the Space of twenty four Hours more, obſerving the ſame Cautions as before, to keep the Lees from evaporating: When the Yarn has lain thus long a bucking, they let go the Lees a ſecond Time, and when it is cool'd, they rinſe it very well in cold Water, and proceed to wring it on the Engine they have for that Purpoſe: When it is well wrung, they place their Poles in the Hanks, about a Foot Diſtance from each Ley-band, and ſhake it and ſpread it on the Poles, ſo as the Yarn may lye as looſe without clinging together as is poſſible: They then ſpread the Yarn, Poles and all, on the Graſs, for three Days and three Nights, turning it every Day, and afterwards hang the Poles and Yarn on the Horſe, till it is perfectly dry; or if the Weather will not ſuffer it to hang on the Horſe, they then hang their Yarn and Poles under their Penthouſes till it is compleatly dry, ſo as to weave it.

Thus may you perceive what Quantity of Aſhes are made uſe of in the bleaching of ſix ſhort Hundred of Yarn; but leſt there might be a Miſs-computation or Miſtake in this Matter, which is ſo eſſential to the Trade, I ſhall caſt up the Quantity of the Aſhes made uſe of on each Occaſion: Firſt, there are ſixty Pound Weight o Aſhes imployed in the boiling of eac hundred and twenty Pound Weight o Yarn, and there being five time

The *Dutch* uſe ſixty Pound Weight of Aſhes, in the boiling of each 120 Pound Weight of Yarn.

tha

that Quantity boil'd ere they buck; theſe Boilings take up three Hundred Weight of Aſhes, and the twice bucking takes from ſeventy five Pound Weight to eighty, according to the Strength or Goodneſs of the Aſhes, or the Yarn is more or leſs kindly in the bleaching; ſo that the whole ſix Hundred Weight of Yarn may be reaſonably computed to take three hundred and eighty Pound of Aſhes, which will ſufficiently bleach this Quantity of Yarn, provided the Hemp was well ſaved and watered, and is of a kindly Nature in it ſelf, for it may be hard and ſullen, from ſome Imperfection in the Soil; in either of which Caſes, the *Dutch* themſelves are forced to give their Yarn a ſecond Buck, ere they can bring it to that bright Colour they ſo much affect in *Holland*. I muſt here beg my Reader's Pardon, that I make this general Obſervation on the whole Matter, relating to the bleaching of hempen Yarn for Sail-canvaſs, That the Bleacher and thoſe employ'd under him, can never be over cautious or careful, that all Parts of their Yarn have equal Share of the Lees, both in boiling and bucking; therefore, the round Balls put into the Boiler, muſt not be drawn hard, ſo as to prevent the

Lees piercing them through and through with Eaſe: It is true, the Ley-bands muſt be kept on each Hank, but not ſo ſtraitly tied as to make the Yarn cling together; therefore, they lay their Hanks in the Lough-bank, and ſpread it as even and light as poſſibly they can, ſo as the Lees may penetrate each Thread of it in the bucking:

When they are to weather their Hemp on the Poles they ſhake & divide each Thread from the other.

And when they are to weather it on the Poles, they ſhake and divide each Thread from the other, ſo as no Part of it may cling together, for otherwiſe ſome of it would be rowy, and make Rows in the Canvaſs, which cannot afterwards be retrieved or cured.

The Names of the ſeveral Sorts of Aſhes made uſe of by the Dutch, *and the Prices they are ſold for in* Holland. *viz.*

The Names of the ſeveral Aſhes made uſe of by the *Dutch*, & the Prices they are ſold for in *Holland.*

Ellibanks——— 8 $\frac{1}{2}$ Doyts *per* Pound.

Double Depriſe——— 10 Doyts *per* Pound.

Sattiens——— 9 $\frac{1}{2}$ Doyts *per* Pound.

Caſſoepes——— 11 $\frac{1}{2}$ Doyts *per* Pound.

Kerriſouſe——— 10 Doyts *per* Pound.

Zeuda——— 11 $\frac{1}{2}$ Guilders *per* Hundred, I have already obſerved, that a Guilder contains twenty of their Stivers, and is equal to two Shillings *Engliſh*; their Stiver contains eight Doyts; ſo that it is an eaſie Matter to reduce their Money to ours of *England*, and afterward, that of *England* to ours of *Ireland*.

A Guilder contains 20 of the *Dutch* Stivers.

A Stiver contains 8 Doyts.

When they boil their hempen Yarn, they uſe an equal Quantity of *Ellibanks*, *double Depriſe*, *Sattiens*, *Caſſoepes*, and *Kerriſouſe*, mingled all together; but when they buck, they uſe none but *Zeuda* and *double Depriſe* Aſhes. All theſe Sorts of Aſhes when uſed, muſt be well ground and ſifted, or well pounded and ſifted; when they grind them, they have Mills in *Holland*, which go in the Manner as the Stones do for grinding of Rape-ſeed; but ſome pound it, with a Beater made of a hard Piece of Wood, about twelve by fifteen Inches oblong ſquare, and two Inches and a half thick, well ſhod with a Plate of Iron, about a Quarter of an Inch thick, with a Handle made after the Faſhion of Mr. *Slator*'s Beaters, for beating out Flax-ſeed; with this, they beat the

What Quantity of Aſhes the *Dutch* uſe, when they boil their hempen Yarn.

When the *Dutch* buck their Yarn, they uſe none but *Zeuda* & *double Depriſe* Aſhes.

The Mills in *Holland*.

Aſhes on an old Mill-ſtone, or a large Flag-ſtone fix'd in the Floor.

The Engine for wringing Yarn, its Deſcription.

The Deſcription of the Engine for wringing Yarn.

A. The Sill, 12 Foot long in the Clear, 12 by 9 Inches ſquare, ſetled about 2 Foot in the Ground.

B. B. The upright Poſt, 8 Foot long, 12 by 9 Inches ſquare.

C. The Trough to carry off the Water, by the Spout at S.

D. The Winlace 1 Inch and ½ diameter, and about 3 Foot and ½ long, made with a Shouldering at Q. 3 Inches diameter, with Teeth for the Catch R.

E. The Hook, 12 Inches within the Upright, to anſwer the Winlace D.

F. F. Two Braces put to the Sill and upright Poſts of B. B.

G. The Supporters for the Trough C.

H. H. Braces from the Sill to the upright Poſts, from A. to B. B.

The

The Uſe of the Engine for wringing of Yarn.

The Uſe of the Engines for wringing of Yarn.

PUT one Hank of Yarn double over the Hook E. keeping the two Ends open, through which they thruſt another Hank, and ſo continue linking them together, till they will reach to hang on the Hook of the Winlace D. wring them very hard, and the Catch R. will hold them to the Degree they were wrung to, while the Wringer runs his Hands along the Yarn, to ſweep off all the Wet which remains on the Outſide of the Yarn, to make it as dry as poſſible, then they put it on the Poles, as was before directed.

SECT. XIII.

Of Weaving Sail-canvas.

THE *Dutch* weave their Sail-canvas in Looms, made much after the ſame Manner and Form as thoſe are which are made Uſe of at *Dunkittle*, by Colonel *Edward Hoar* in his Factury, for the making of Sail-canvas, only the Scantling are ſomewhat larger in *Holland*, eſpecially the ſeveral Beams made Uſe of in the Loom.

The Yarn-beams of each Loom are all contrived with Shoulderings at each End of them, in Proportion to the Breadth of the Canvas, which keeps the Yarn from Rolling from its proper Place; by which Means they make the Selvages of their Canvas exceeding even and ſtrong, and is of great Conſequence to the Sails: Theſe Shoulderings are rais'd about four Inches higher than the reſt of the Yarn-beams; their Tradles and Spring-ſtaves are linked together with Iron-links, and alſo their Seats are made with a Sloap towards their Tradles, ſo that the whole Weight of the Weaver lies on the Tradle, to keep it firm while he ſtrikes the Woof to its Place, with the Slay-board. I preſume the *Dutch* Weavers now at *Dunkittle*, have thus fitted the Looms wherein they work; but if they have not, it is requiſite they ſhould, for the Goodneſs of the Canvas very much depends thereon.

The *Dutch* count the Number of Threads which compoſe each Beer by ſingle Threads, but in *England*

The *Dutch* count the Number of Threads which compoſe each Beer, by ſingle Threads.

and *Ireland*, they are always counted by double Threads; therefore, when they in *Holland* are about to warp a Canvas of thirty Inches broad, they uſually put from thirty nine to forty five Beers therein, according as they intend to ſlay higher or lower: But in *England* and *Ireland*, their Manner of the Count of the Beers is thus, that is to ſay, their thirty nine *Dutch* Beers make but nineteen and a Half of ours, and the forty five Beers of theirs make twenty two and a Half of ours, for the Reaſon I have already given.

Weaving of Sail-canvas.

When the *Dutch* weave Sail-canvas, they make their Dreſſing of Buck Wheat-meal; whereas we make ours of Wheat. Theirs is much better, which is a great Defect in us, conſidering Buckwheat would grow any where in *Ireland*, if it were cultivated, and be of great Uſe to other Purpoſes as well as this.

The *Dutch* do not tallow their Warp, as they do in *Ireland*.

They do not tallow their Warp with hard Tallow, as we do, but they dreſs it with green ſoft Soap, which makes the Warp much more plyant than Tallow does, Half a Pound of their ſoft Soap will dreſs a Bolt.

Their Manner of computing what the Proportion ought to be of Warp-yarn and Woof-yarn is thus: That is to ſay, they firſt compute how many Pound Weight of Warp and Woof-yarn the Bolt will take; then they apportion to the Warp ſuch a Weight, and to the Woof ſuch another Weight; as for Inſtance, if a Bolt of Canvas is deſigned to weigh forty five Pounds, the Woof of it ought to be twenty ſeven Pound Weight, ſo as the Weight of the Warp, compared to the Weight of the Woof, is as eighteen is to twenty ſeven; ſo likewiſe, when a Bolt is intended to weigh thirty nine Pound, the Woof muſt be twenty two.

The Wages given in *Holland*, for weaving Sail-canvas.

The Wages given in *Holland*, for weaving of Sail-canvas, is much the ſame with what is given at *Dunkittle*, viz. nine Shillings *per* Bolt, to ten Shillings, where the Sail-canvas is thirty Inches wide, and contains forty five Beers of theirs, or twenty two Beers and a Half of ours; but if the Canvas be thirty Inches wide, and contains only thirty nine of their Beers, or nineteen and a Half of ours, then they have only from ſeven to eight Shillings *per* Bolt for weaving. A Bolt

A Bolt

of Sail-canvas in *Holland*, contains fifty *Dutch* Ells in Length, which is thirty ſeven Yards and a Half of our Meaſure, and each Bolt is ſold there, from fifty eight Shillings to three Pound *per* Bolt.

of Sail-canvas in *Holland*, contains 50 *Dutch* Ells.

What each Bolt of Sail-canvas is ſold for in *Holland*.

SECT. XIV.

The Method of making Braſs-reeds for Sail-canvas.

IN *Holland*, they make all their Reeds or Slays of Braſs-ſplits; for which Purpoſe they chooſe the tougheſt and cleareſt grain'd Braſs-plates that they can get, being the tenth Part of an Inch thick: They then divide the Plate, marking out the Length of the Split, and cut ſo much off the Plate, from End to End. After this they divide this Piece of Braſs-plate, into ſo many Splits as they judge proper; and with a Hammer and File, they beat them out, and file them to a Truth, and ſet them in the Reed or Slay, in an Engine herein deſcribed.

A. The Frame eight Foot long, eight by ſix Inches ſquare, in the Manner of a Lath with Popots.

B. B. The two Popots about twelve Inches above the Frame, with Tenent coming thro' at Q.

C. C. Iron Claſps for fixing the Ribbs of the Reed F. with two Screws in each.

D. The Screw, with its Nut on B. and Swivel in C. to ſtrain the Ribbs of the Reed F.

E. E. The Standard for A. about $3\frac{1}{2}$ Foot high.

G. The Pott with Duff-coal to melt the Wax-thread, when laping in the Splits.

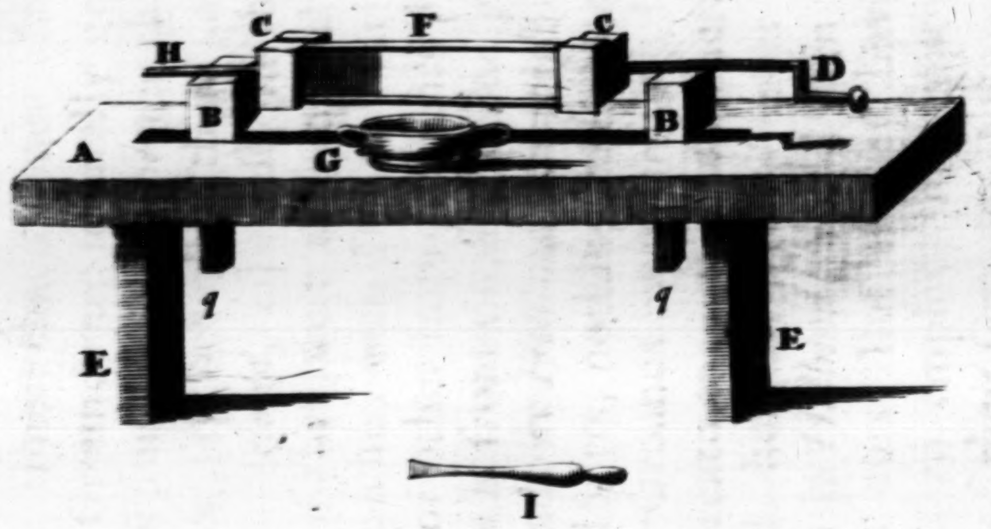
H. The Center with a Button-ſwivel in C. to anſwer D.

The Driver twelve Inches long, two broad and $\frac{1}{10}$. to drive the Splits cloſe.

SECT. XV.

Of Sowing and Saving of Flax.

IN thoſe Parts of the United-Provinces where Flax is moſtly cultivated, they chooſe their beſt Barley-grounds, therein to ſow


H
C
F
C
D
B
B
A
G
q
q
E
E
I

ſow
are
tim
har
red
Flax
be
that
prol
yet
Gro
Part
up
poſt
the
thei
Cro
For
unsk
our
thei
bett
mor
the
and
tenſi
a ſm

ſow their Flax-ſeed; but thoſe Sort of Grounds are with them ſo light, and at the ſame time ſo good, that with twice plowing and harrowing, they are better fitted or prepared for the Reception of either Barley or Flax-ſeed, than any of our Grounds would be by four times that Labour: It is true, that their Grounds are naturally good, and probably in ſome meaſure better than ours; yet I cannot ſay but that there are many Grounds in *Ireland*, eſpecially in the South Part of it, if they were as frequently turn'd up and enriched with Dung, Marl, Compoſt, *&c.* or other Improvements proper to the Soil, as is from time to time given to their Grounds in *Holland*, we might expect Crops of all Sorts, nothing inferior to theirs: For if their Grounds met with ſuch lazy and unskilful Treatment, as the Generality of our Grounds here in *Ireland* meet withal, their Crops in *Holland*, would then be little better than ours: But as they have vaſtly more Hands to employ, in proportion to the Extent of their Grounds, than we have, and conſequently their Farms are not ſo extenſive as ours, their Labour is confin'd to a ſmall Pittance of Earth, improved by Induſtry and Skill to the greateſt Degree of Perfection that Agriculture can attain to.

The *Dutch* ſow their Flax-ſeed, about the Middle of *April*.

The *Dutch* ſow their Flax about the Middle of *April*, and when it is grown about ſix Leaves high above the Ground, they roll it with a Roller made eight Square, ſix Foot long: This Roller is drawn by a Horſe, ſhod with broad leathern Shoes, to prevent his cutting the Flax as he treads thereon, or his ſinking too far into the Soil. Their Way of judging when their Flax is ripe, is exactly the ſame with what Mr. *Slator* has ſet forth.

The Manner of ſaving their Flax in *Holland*.

Their Manner of ſaving of Flax differs much from what is practis'd, either in *England* or *Ireland* that I know of; tho' as to the pulling of it, I did not obſerve that the *Dutch* pull the fine Flax, and the coarſer Sort ſeparately, as Mr. *Slator* very well adviſes; for certainly there is ſome Difference in point of rating them; however, the *Dutch* do not heed it, but when they have pulled as much Flax as they can well hold in their Hand, they lay that down and pull another Handful, which they lay acroſs the firſt, till they have as much as will make a Sheaf, and there let it lye for ſix or ſeven Days to weather; then they turn the Inſide out of their Flax, as they bind it into Sheaves; eight or ten of theſe Sheaves are by them placed on the Butts, in a round or circular Form, with the Heads leaning on each other, ſo as the Wind may paſs thro' them: Thus they proceed with all their Flax, and leave it there eight or ten Days more, until it is perfectly dry; then carry it to their Barn, and riple in the Manner herein after deſcribed, ſuch Part of their Flax as they deſign to riple that Seaſon.

The Flax which the *Dutch* reſerve for Seed, they never riple the ſame Seaſon they pull it.

The Flax which they reſerve for Seed, the *Dutch* never riple the ſame Seaſon they pull it, but keep the Flax and Seed together till the enſuing Spring, and in the mean time, either houſe it or ſtack it, in ſuch a Manner as may beſt preſerve it from Rain or other Water, until they have occaſion to ſow it.

When they have ripled as much Flax as they deſign to riple that Seaſon, they gather all the Boughs, and lap them up in round Bundles, with the Rubbiſh and waſte Flax, and lay theſe Bundles Side by Side on a plain Floor, paved for that Purpoſe; the

Floor is about forty Foot ſquare; they then bring the Carriage of a Wagon, drawn by two Horſes, and thereon lay a conſiderable Weight; which Horſes and Wagon they drive over theſe Bundles, until they conceive they have broke the Boughs and trod out the Seed; but leſt there might be ſome Inequality in the Preſſure, they very carefully turn the Bundles, as the Horſes and Wagon paſs over them; this they continue doing, till they conceive that the whole Seed is perfectly trod out, and the Boughs broke.

Their Manner of ſeparating the Seed, &c.

Their Manner of ſeparating the Seed, with the broken Pieces of the Boughs or Pods from the groſſer Part of Rubbiſh, is in this Manner: They have a large meſh'd Riddle, which is fix'd in a Frame contriv'd for that Purpoſe only, which ſuffers nothing to paſs through it, but the Seed and the Shells of the Boughs or Pods; theſe they convey to an upper boarded Floor, and ſpread them as thin thereon as poſſibly they can, allowing as much Air thereto, as is requiſite to keep the Seed from heating, and turn it every Day conſtantly, till the Seed be ſufficiently dry: Afterwards they turn it every

Week at leaſt twice, till ſuch Time as there is a Demand for it in the Market: Then have they Sieves made with a large Parchment Bottom, punch'd as full of ſmall round Holes, as cloſe and contiguous as can be, ſo as not to ſuffer the Flax-ſeed it ſelf to paſs through, but only the Duſt and the Seeds of the Weeds: This done, they have another Parchment Sieve, punch'd with oblong Holes, through which they ſift the Flax-ſeed, and ſever it from the Pieces of Boughs or Pods, which till then the Seed was mix'd with: There is now at the Board of Truſtees, one of each of theſe Sorts of Sieves, and a Sieve-maker may eaſily imitate them.

Of cleaning Flax-ſeed.

They have another Way in *Holland* of cleaning their Flax-ſeed, but it is very ſeldom uſed, neither does it clean Flax-ſeed ſo well as the Parchment Sieves do, therefore I decline deſcribing them.

SECT. XVI.

Remarks on the Ripling of Flax.

THE Reaſons why the *Dutch* when they pull their Flax, lay the Handfuls acroſs each other, and ſuffer it ſo to remain for ſix or ſeven Days till it is weathered, before they bind it up in Sheaves, is that they may the better manage it when they riple, without breaking or bruiſing the Harl or Straw of their Flax; by this Means, each Handful clings together, and readily ſeparates from the reſt of the Sheaf when they are about to riple, for more than one Handful cannot be ripled at a Time.

Ripling of Flax much preferable to thraſhing.

In my humble Opinion, the rippling of Flax is much preferable to the thraſhing of it in any Manner whatever, for the following Reaſons: Firſt, their Ripling-comb not only ſevers the Boughs or Seed-pods from the Flax, but it alſo ſevers the Leaves and Branches from it, which thraſhing cannot do, the ſame Seaſon it is pull'd. Secondly, the Flax lies better in the Water, and ſpreads more eaſily on the Graſs, when by ripling, the ſuperfluous Branches are removed; and it likewiſe ſwingles better.

The *Dutch* are very careful not to ſever the Seed they intend to ſow themſelves, till the enſuing Seaſon.

I have already obſerv'd how careful the *Dutch* are, not to ſever the Seed which they intend to ſow themſelves, from the Stalks of the Flax, till the enſuing Seaſon for ſowing it: Their Reaſons for ſo doing are, that they conceive the Seed is not only leſs liable to heating, but that it likewiſe atracts further Nouriſhment from the Stalks, than what it had when pull'd. In *Holland* they ſeldom ſow themſelves any of the firſt ripled Seed, but convert it either to Oyl, or export it to foreign Markets.

In *Holland* they ſeldom ſow themſelves any of the firſt ripled Seed.

Many are the Devices and Tricks which the *Dutch* put in practice with their export Flax-ſeed: Firſt, they are not always very careful that the Seed they export, be all of it well preſerved from heating on the Floor or in the Cask: Secondly, if they have any old Seed by them of a former Seaſon, which has ſlipt the Market, they make no Scruple of mixing it with the freſh Seed; neither do they ſcruple to mix decayed or degenerated Seed with their freſh Seed: Thirdly, the *Flemings* ſet little or no Value upon their Seed, ſave only ſuch Seed as they reſerve for their ſowing; therefore pull their Flax before the Seed is half ripe, that the Flax might work ſo much the finer; theſe Seeds the *Dutch* buy from them, and mix with their own

The *Flemings* pull their Flax before the Seed is half ripe.

own, in ſuch Proportion as not to be eaſily diſcern'd by the Buyers: Fourthly, the *Dutch* ſupply themſelves from *Riga*, *Nerva*, or other of the Eaſt-land Countries with Flax-ſeed, from time to time as they have occaſion; but becauſe the Eaſt-country Flax-ſeed is univerſally mixed with the Seeds of the Weeds which grow along with the Flax, they are very careful to ſeparate the one from the other; they keep the good Seed to themſelves, but they never fail to make their foreign Cuſtomers pay equally for theſe Seeds of Weeds, as they do for their beſt Flax-ſeed; for they divide them conſtantly into each Cask or Hogſhead which they export: And if they intend to impoſe their own Seed on the Buyer, they mingle theſe Seeds of Weeds with ſome of their own Flax-ſeed, and cask them up in ſmall Casks, containing three Buſhels and a half, in Imitation of thoſe made uſe of in other Countries.

Thus are Foreigners who deal with the *Dutch* for Flax-ſeed impos'd on, and I cannot think of any Expedient to prevent it, unleſs the Board of Truſtees find out ſome Way to have this Kingdom ſupply'd with the Eaſt-country Flax-ſeed, in as cheap and beneficial a Manner as the *Dutch* are: Our People here may ſoon learn to ſeparate the Flax-ſeed from the Seeds of the Weeds, in the ſame Manner as the *Dutch* do, by the Means of their Parchment Sieves; or theſe Seeds may be ſeparated by the Care and Diligence of the Factors, in thoſe Countries where the Seed is bought; whereby the Expences of Casking, Freight, Portrage, and other incident Charges, may be very much leſſen'd or ſaved, and theſe noxious Weeds kept out of our Country, and not foul our Grounds as they will infallibly do, unleſs each Flax-man be very careful and diligent, ere he ſows his Flax-ſeed, to cleanſe it from all other Seeds.

The moſt pernicious of all theſe Weeds, is that which is called in *England*, Heigh-op: I know not by what Name it is called here, but the Weed it ſelf grows among the Flax, and twines it ſelf about it, as Hops do round a Pole; by which Means, the Harl of the Flax is cut or tewed, or elſe makes it ſo rotten, that it won't work. It is hard to diſtinguiſh at weeding Time, this plaguey Weed from the Flax; the Seed of this Weed is eaſily diſtinguiſhed from the

Flax-

The Seed of Heighhop is ſhaped like Muſtard-ſeed.

Flax-ſeed; for it is ſhaped like white Muſtard-ſeed, ſomewhat leſs in Size, and of a bright yellow Colour.

Selling of Flaxſeed in *Holland*.

In *Holland*, when they ſell their Flax-ſeed to the Oyl-mills, they generally ſell it at thirteen Guilders *per* Hogſhead, which is twenty ſix Shillings *English* Money.

A Deſcription of the Ripling-comb.

A. The Bench eight Foot long, fifteen Inches broad, and two Inches thick.

B. Is the Comb it ſelf, the Teeth whereof ought to be of Iron, and fifteen Inches long; the Edges of the Teeth ought to ſtand directly oppoſite to each other, the better to catch the Boughs of the Flax as it is ripling.

C. C. D. D. Are the Feet with their Braces, which ſupport the Bench, and are about two Foot and a Half high.

The Method obſerved in *Holland* in ripling of Flax, is thus: They firſt ſpread a large winnowing Sheet on the Floor, over which they place their ripling Bench, to which Place they bring the Sheaves of Flax, in order to be ripled; then two Men mount the Bench, or ſit aſtride thereon, one on the one Side, the other on the other of the Comb, each of whom is ſerved by a Perſon, whoſe Care is to open the Sheaves, and to hand to his Ripler the Handfuls of Flax, of which the Sheaf was compoſed, and I formerly mentioned: And as the Ripler riples that Handful, the Perſon who tends him receives that back again, and ſupplies him with another Handful. The ripled Flax is laid by it ſelf, obſerving ſtill to keep the Handfuls together, till they have a ſufficient Quantity wherewith to make a Sheaf; then the Perſon who tends the Ripler, binds it into a Sheaf about three Quarters of a Yard in Circumference: When they have thus ripled all the Flax they deſign to riple that Seaſon and bound it into Sheaves, their next Care is to rate it.

The ripled Flax is laid by it ſelf.

But before I proceed to acquaint you with heir Manner of rating, it is requiſite I hould inform you, that the *Dutch* re very curious and neat in the maing of all and every of their Enines, ſo as they might beſt anſwer heir Purpoſes in every Reſpect; herefore in the making of this Ri-

The *Dutch* are very curious in the making their Engines.

pling-bench, they do not make it flat at the Top, but on the contrary, make it as round at the Top as they conveniently can, to the End the Perſons that ſit upon them, might ſit with Eaſe, and each of them ſtrike their Handful of Flax into the Comb alternately; by which Means, they riple their Flax with fewer Combs, and with greater Diſpatch than otherwiſe they could do. There is yet a further Conveniency in the rounding of this Bench, which is, that neither the Seed, Leaves, nor Branches of the Flax lye on the Bench to cumber it, but conſtantly fall on the Winnowing-ſheet, as the Riplers proceed in their Work.

SECT. XVII.

The Manner of Rating of Flax in Holland.

In Holland they chooſe ſtanding Water for rating Flax in.

THEY always chooſe in *Holland* ſtanding Water for rating Flax in; and to the End they may perform their Work with the utmoſt Exactneſs, they meaſure the Depth, the Breadth, and the Length of the Water they deſign to employ; they know by the

Number of the Sheaves of Flax, what Space they ſhall fill; they generally rate their Flax the Drains about their Lands, which for the moſt Part are from eight to ten Foot deep, and from ten to ſixteen Foot wide, more or leſs, according as their Land is, ſwampy or wet.

Thoſe Sheaves that they deſign to lay in the Bottom of their Water, they tie with Strong-bands, within ſix Inches of each End of the Sheaf. Then draw ſome ſtrong Twine through the Middle of the Sheaf, between the Bands: With this Twine, they tie their Bands Sheaf by Sheaf, till they have formed a Plat-form of equal Length and Breadth with the Water they rate in. This is always done on the Banks of the Water; and when they have ſtitched together as many of theſe Sheaves as is neceſſary, they ſhove the whole Plat-form into the Water, which floats thereon; whereby they have an Opportunity to lay another Range of Sheaves athwart the other, till they have compleatly covered their Plat-form: They conſtantly obſerve in rating of their Flax, to lay firſt the Plat-form with their Flax, the long Way of the Canal:

The *Dutch* draw ſome ſtrong Twine through the Middle of the Sheaf.

nal: The next Range of Sheaves is laid acroſs the Canal; and ſo they proceed alternately, till their Flax is piled up as high as they deſign to raiſe it: But to the end they might ſink it gradually, they always ſtand on their Flax in the Water, after they have laid two or three Ranges; by which means, they are readier in the placing of the Sheaves on the Pile, till they conceive that the Pile of Flax when ſunk, will be about fourteen Inches under the Surface of the Water; and becauſe they have no Stones in that Country, to ſink it withal, they are forced to ſink it by the Weight of ſuch Sluſh or Mudd, as they can get from the Bottom of their Drains.

When their Flax has been in Water about four Days, they thruſt their Arm as far into the Water as they can, and draw forth a Handful of the Flax by the Butts, which they ſpread thin on the Graſs: If they obſerve when this Flax is dry that it is ſufficiently rated, they then raiſe all their Flax from out the Water; but if they perceive it is not ſufficiently rated, they repeat this Experiment twice a Day, until they are ſatisfied that the whole is watered enough: Their next Care is to diſcharge it of the

Mudd and Sluſh that was on it, and raiſe their Flax, Sheaf by Sheaf, till they have taken it all out of the Water; yet as they raiſe it, they never fail to rinſe each Sheaf in the Water, to cleanſe it from the Filth it contracted in the Water, as it lay therein, purging and fermenting.

Having thus rais'd their Flax, and cleanſed it, they open the Sheaves, and ſpread their Flax as thin on the Graſs, Row by Row, as Mr. *Slator* has mentioned; where they never ſuffer it to lie more than two Days, in order to ſtiffen it, unleſs they perceive ſome Part of it to have been underrated: In which Caſe they leave ſuch Part on the Graſs till it be ſufficiently rated; but if they find on the graſſing of their Flax, the Water has had its Effect, they (after two Days Time) gather as much of the Flax as they conceive will make a Sheaf; this they open very wide at the Butt, in the Form of a Bird-cage, giving the upper End a little Twiſt, to make it cling together: Thus they ſet all their Flax through a whole Field, Sheaf by Sheaf, in Rows; and if any happens to be overturned by the Wind, they ſet it up again; and there let it ſtand, till it is ſufficiently dried and weathered.

SECT.

SECT. XVII.

Reaſons why Flax ought not to be rated in running Waters.

Water that has a great Currency through Flax, will fret and tear the Harl.

IF Water has any great Currency through Flax, it will fret and tear the Harl to ſuch a Degree, that allowing it ſhould not ſpoil the whole, yet will it cauſe ſo great a Waſte in the working, as that the Owner will be a great Sufferer thereby; but further, the Harl which remains untorn will not be worth the working, it will be ſo very hard and wirey. In proof of what I here aſſert, be pleaſed only to obſerve, that whenever Oak or ſolid Timber is cut down when the Sap is in it, be the Beams never ſo large; if you place them for two or three Months in running Water, the Sap will be as effectually waſh'd out of the Timber, as if it had been cut down in the Depth of Winter: And if running Water has ſuch Power over large Logs of Timber, what muſt its Power be over ſo tender a Plant as Flax is. There is yet a further and more eſſential Reaſon why Flax ought not to be watered in a running Water, which is this, the

Water running through the Flax, will keep it ſo cold that it will never ferment.

the Water running through the Flax will keep it ſo cold, that it would never ferment. Now Fermentation is as requiſite to make the Flax purge it ſelf from the Filth which it brings with it from the Soil, as any thing which happens in the rating: Therefore a ſkilful Flax-man uſes his utmoſt Induſtry to keep his Flax under Water while this Fermentation laſts, that all the Flax may partake thereof.

Rating Flax in Bog-holes.

I would not be underſtood by this, as if I were for encouraging the pernicious Practice of rating Flax in Bog-holes, too frequent in *Ireland*, which I fear occaſions the Rows in their Linnen, and the dark and ſullen Caſt which commonly attend the *Iriſh* Linnen, though the Bleacher has performed his utmoſt Skill; for it is evident that Turff-mold will always ſtain the Water which ſtagnates or ſtands therein; and tho' Water which ſtands in ſtiff Clay is not liable to this Objection, yet I would not have it altogether ſtagnated Water, but have my Rating-pond ſo contrived, that I could give it a Recruit of freſh Water gradually, or by ſuch Degrees as might neither

Turf-mold will always ſtain the Water.

ther occaſion a great Currency of the Water in my Pond, or prevent the Fermentation of my Flax.

Lough-water is prefera-ble to any Ponds whatever.

Lough-water (in thoſe Parts of this Kingdom where it can conveniently be had) if it will bear Soap, is preferable to any Ponds whatever; becauſe thoſe Waters are better weather'd than any other, and conſequently more ſoft: But where Lough or Lake-water can't be had, it is then of abſolute Neceſſity that Ponds be made, after ſuch a Manner as to be ſufficiently ſupply'd at all times, with Water drawn from Rivers or Brooks. I ſee no Reaſon why the Rating-ponds ſhould be made ſo narrow as Mr. *Slator* has directed; for if they be made ten or twelve Foot wide, conſequently the Pile of Flax will be ſo much the larger, and the Fermentation quicker and more effectual: The Charge will be much the ſame, provided the Soil be free from Rocks, which of all Things muſt be avoided in Rating-ponds.

The Depth of the rating Ponds.

And as to the Depth of them, they ought never to be leſs than five or ſix Foot deep, nor more than ten.

SECT.

SECT. XVIII.

The Reaſons why the Dutch *do not graſs their Flax, ſo much as in* England *or* Ireland.

The *Dutch* are very fond of having their Flax of a beautiful Colour.

THE *Dutch* having ſtiffened their Flax on the Graſs, they raiſe it on the Butts, and open it as evenly as they can poſſibly at the Butts, in order to give it all the Benefit and Advantage it can have from the Sun, the Wind, and the Air. They judge that it is the Water which rots the Bunn or Straw of the Flax, and cauſes the Harl to ſeparate readily from it. They are very fond of having their Flax of a beautiful Colour, which they conceive they can't have, if their Flax be ſuffered to lie long on the Graſs, which would infallibly grow through it, and conſequently would ſhade the Flax, and prevent the Air from paſſing ſo readily thro' it, as it would otherwiſe do, when placed (as aforeſaid) on the Butts. They likewiſe judge, that whatever Rain or Dew falls, in the aforeſaid Poſition, will ſink readilier down to the Earth, and leſs hinder the Bunn from drying,

ing, than it will when laid flat on the Graſs. For my own Part, I am humbly of Opinion, that this Way of Management, were it put in Practice in *Ireland*, would turn to good Account. In point of Colour of their Linnen, there ſtands one Objection in the Way of this Practice, which muſt be obviated, elſe I fear *Ireland* can ſcarce comply with it; for ſhould any great Storms of Wind catch the Flax thus erected on the Butts, it would have much more Power over it, and be apt to mingle their Butts and Ends ſo together, as it would create a vaſt deal of Trouble in the ſetting all right again; for to be ſure, the Butts of Flax or Hemp muſt be always kept together, elſe it could never be dreſs'd; therefore the Seaſon or Time of the Year when Flax is graſſing and weathering, after it is rated, ought to be very well weigh'd and conſidered; for ſhould it be during thoſe great Storms which are vulgarly called in *Ireland*, the *Michaelmas* Rigs, it would be impoſſible to raiſe Flax in the Manner practiſed in *Holland*, or indeed to graſs it flat on the Ground, without being toſs'd and tumbled by the Storms. The only Way to remedy this Evil is, to ſow early in *April*, that the Flax may be the earlier ripe, pulled, and rated, ere theſe Storms uſually happen.

SECT. XIX.

Of the Management of Flax reſerved for Seed.

I Have already acquainted you, that the *Dutch* never ſever the Seed which they themſelves intend to ſow, from the Flax, the ſame Seaſon it was pull'd in: Therefore when they are juſt ready to ſow, they fall to ripling of it as faſt as they can, and cleanſe the Seed from all its Filth and Seeds of Weeds, in like manner as they did the former; then do they either rate the Flax immediately, in the Drains which they have in their Grounds, or defer the rating it, till they fall to rating of the enſuing Crop; but they never rate them both in the ſame Pile, becauſe the Seed-flax will take ſomewhat longer Time to rate it in, than the other; but in all other Reſpects it is managed exactly conformable to the other; and if the Flax-man be skilful that rates it, I could never obſerve much Difference between either the Goodneſs or Colour of the Flax, the one from the other.

SECT. XX.

Of Breaking, Swingling, or Scutching Flax.

THE *Dutch* before they break their Flax have a large Oven, which they make ſo warm as they can put their Flax with Safety therein, placing it on the Butts; having firſt untied the Sheaves, they ſtop the Mouth of this Oven as cloſe as poſſible, and there let the Flax ſtand for the Space of twelve Hours to ſweat; this done, they remove it thence, and bind it into Sheaves as large as they pleaſe, and cover theſe Sheaves with Cloths as cloſe as they can, and there let it lye for ſix Hours more. The Way they have to judge whether the Oven be in Temper or not, is by putting in a Handful or two of their Flax on the Butts into the Oven, ere they venture to expoſe any Quantity of Flax therein; and accordingly

The Way to know whether the Oven be in Temper or not.

they either encreaſe the Heat, or ſuffer the Oven to cool till it is in Temper.

When Flax has been thus managed, during eighteen Hours, they apply themſelves to the breaking of it; which they do in Breaks made with three Bars under, and two above; the Maſh of their Breaks is made ſhallower than thoſe generally made in *England* or *Ireland*; the Rollers of theirs are ſquare, and not rounded off as ours are, which keeps their Work tighter and ſteadier than ours do; their Breaks are ſomewhat ſhorter than ours; which has a good Effect on their Flax, becauſe they can manage them more nimbly and readily, and whip their Flax and turn it under the Break, ſo as to break and ſqueeze the Bunn to Pieces; and the Maſh of their Breaks being ſo ſhallow, the Harl runs no Riſque of breaking or tewing.

Breaking of Flax.

This Practice in *Holland* of thus baking their Flax, is not only very rational, but expedient to be imitated; becauſe it is freed from all Inconveniences of Fire or Smoak, which generally attends the kilning or drying of Flax over-Fire; and at the ſame Time, it makes the Bunn to break,

Baking their Flax is not only very rational, but expedient.

break, and the Harl to ſeparate readily in the ſwingling, and not run ſo much to Tow or Backings, as otherwiſe it would.

Scutching Boards. The Scutching-boards which they make uſe of in *Holland*, are much the ſame with thoſe we of late make uſe of in *Ireland*; but their Scutching-handles differ much from ours, as appears by the Figure. They break and ſcutch ſix Pound of Flax for five Stivers, which is equal to our *Engliſh* Six-pence; ſo that it amounts exactly to a Penny a Pound, which is much after the ſame Rate that is paid in *Ireland*, to the moſt skilful of our Swinglers.

SECT. XXI.

Of Hackling of Flax.

Hackling of Flax. THEY generally hakcle their Flax in *Holland* by the Women, who are exceedingly skilful and dextrous therein: Their Hackles are much finer than thoſe which came from *Coventry*; yet I have ſeen ſome made here by Mr. *Taylor*, which he called his ſuperfine Hackles, which are as fine as any I ever ſaw in *Holland*. I ſee no

Reaſon why the Women here might not be inſtructed to hackle as well as the Men; the Labour is not ſo great, but that the Women might undergo it. As to the breaking, ſwingling, or ſcutching, that I muſt acknowledge to be laborious; yet every Boor in *Holland*, and every good Husbandman in the Iſle of *Axom* in *Lincolnſhire*, not only raiſe great Quantities of Flax and Hemp annually for Sale, but they likewiſe rate, break, and ſwingle it, either by themſelves or their Labourers very skilfully. And I am the more inclined to wiſh that young Girls were taught to hackle in *Ireland*, to that Perfection they ought to be inſtructed; becauſe it will be much eaſier to perſuade young Girls to apply themſelves to that Sort of Work, than it has hitherto been found to perſuade Boys: And as a great Share of the national Profit ariſing from the Linnen Manufacture depends on the well or ill hackling of Flax, it ſhould ſeem to me to be expedient to looſe no Time in the teaching and inſtructing Girls, as well in hackling as in ſpinning.

SECT. XXII.

Of the Spinning of Flax.

The Form of the Wheels in *Holland*.

THEIR Wheels in *Holland* are much after the ſame Form with ours in *Ireland*, called *Dutch* Wheels; only they are made firmer, and the Rims heavier: The Axis on which it turns, altho' it be made of Iron, as ours are, yet is it turned in a Lath to a Truth: Whereas every bungling Smith in *Ireland*, pretends to bring it to a Truth by a File, which is ſcarce practicable.

Flax-wheels require to be made with an exact Proportion between the Wheel, the Whirl, the Spool, and the Flyers. I have endeavoured to inform my ſelf of the true geometrical Proportions of each of theſe, by diſcourſing with the ableſt Wheel-wrights that I could meet with, wherever I came; but it has been hitherto all in vain: For either they could not, or would not tell how and in what Manner this Myſtery in the Trade, might be brought to a more mechanick Regulation than at preſent it is under.

Theſe

Obſervations on the Improvements of ſpinning Linen-yarn.

These Obſervations might have great Influence on the Improvement of ſpinning Linnen-yarn in *Ireland*; for if the Wheels and Axes be made to a Truth, and a juſt Proportion obſerved between the Wheel, the Whirl, the Spool, and the Flyers, the whole will move regularly without hobling; the Yarn will be equally twiſted, and it muſt be the Spinner's own Fault, if the Yarn has not a proper Twiſt: It is certain, that Yarn deſigned for Warp, ought to have ſomewhat more Twiſt than Yarn deſigned for Woof, becauſe the latter ought to be more plyant and readier to yield to the Slay, and is eaſier ſtruck up; for which Reaſon, a skilful Houſe-wife's Bolt of Linnen-cloth is, generally ſpeaking, preferable to a Maſter-weaver's Bolt, of the ſame Degree of Fineneſs, becauſe ſhe has taken Care to give a proper Twiſt both to the Warp and Woof.

Spinners in *Holland*.

The Spinners in *Holland* have a Piece of fine woollen-cloth, paſted round the Rock, purpoſely to prevent the Flax from coming down too faſt, as the Spinner draws: Beſides, they have a Piece of Oyl-leather, which they bind gently over the Flax, while it is tied to the Rock, to prevent its drying too faſt, and to preſerve it from Duſt.

SECT. XXIII.

The Deſcription of the Scutching-handle.

THIS Inſtrument is commonly made of Walnut; from A. to B. is about ſixteen Inches; four of which are taken up in the Handle, from C. to C. nine Inches. There runs a Rib in the Middle, from the Point B. down to the Handle, falling off thin towards the Edges at C. C. as *per* Shade on the right Side C.

A Rib in the Middle.

SECT. XXIV.

Of Bleaching of Linnen-cloth, Yarn, Thread, &c.

I Have been twice of late Years in *Holland*, to inform my ſelf the beſt I could, of all and every the Myſteries and Practices in *Holland*, in Bleaching of Linnen-cloth, Linnen-yarn, Thread, Tape, *&c.* I have the Vanity to believe, that there is not one Branch in the whole Bleaching-trade, that I have not acquired the Knowledge of in Theory ; but as to the practiſing it my ſelf in that Country, I could by no Means attempt the doing it: For it is well known to all Perſons converſant of late Years in *Holland*, that the *Dutch* are very jealous of the Endeavours uſed in *Ireland*, to compaſs flaxen and hempen Manufactures ; they are aware of the Benefits which will accrue not only to this Kingdom, but to all His Majeſty's Dominions thereby ; and the immenſe Loſs it muſt be to themſelves, ſhould the People of this Kingdom attain to the Perfection which they in *Holland* have attained to, with great Labour and Induſtry, during theſe two laſt Centuries.

I had frequent Specimens of their good Nature, whenever I attempted the tranſporting hither either Artiſts or Seed from thence: For altho' the Magiſtrates in the united Provinces, are always

Magiſtrates in the united Provinces.

cautious and fearful how they behave towards any of His Majeſty's Subjects, leſt they ſhould draw upon themſelves His Royal and Powerful Reſentments: Yet are the Populace ſo jealous of their Trade, and ſo ready to inſult the Perſon of any Man againſt whom they have any Umbrage, that it is impoſſible for any Stranger, not naturalized, to practiſe any of the Myſtery the *Dutch* are peculiarly skilled in. I my ſelf eſcaped very narrowly from being mobbed twice or thrice by them; and, had I not been very well befriended there, I am confident I ſhould have felt the utmoſt of their Fury, which ſeldom terminates with leſs than the Deſtruction of the Party.

Bleaching depends on the Climate, the Water, and the Ground.

The Rules and Practice obſerved by Bleachers in *Holland*, I found Ways and Means to be informed of; but as Bleaching very much depends on the Climate, the Water, and likewiſe on the Ground made Choice of to compoſe the Bleach-yard. I dare not venture (before Trial made here my ſelf) to give any Directions how to bleach conformably to the *Dutch*. The Honourable the Truſtees of the flaxen and hempen

Manufactures of *Ireland*, zealous to diſcharge their Truſt to the Publick, have cauſed a convenient Bleach-yard to be made near to the City of *Dublin*: The Choice of the Ground and Water they gave me Leave to make, after they had well weighed and conſidered the Reaſons by me offered, for ſuch Choice: They alſo gave me Leave to make the Buck-houſe, Trenches, and Utenſils, requiſite to this Work, after the *Dutch* Model. I hope by the next enſuing Spring or Summer, at the fartheſt, to put in Practice what Knowledge I have acquired in bleaching, either in *Holland* or elſewhere: And when I have made full Proof to my own Satisfaction, how far the Rudiments of this Craft are beſt practicable here, I ſhall chearfully and ingenuouſly communicate them to the Publick, in Diſcharge of my Duty to my Employers, and of the ſincere and high Honour I bear to the Kingdom of *IRELAND*.

Buck-houſe, Trenches and Utenſils.

FINIS.

E R R A T A.

Page 4. Lines 17. & 18. in the Dedication, *for* His had been as compleat a Syſtem, *&c. read* His had been a compleat Syſtem, *&c.*

Page 5. in Dedicat. (Ere he had himſelf experienced here in *Ireland*, how his Obſervations in *Holland* might beſt be put in Practice here) This Sentence ought to be cloſed in a Parentheſis, and the Word (here) preceding (in *Ireland*) left out.

Page 7. Sect. 3. Line 7. dele the Stop after the Word (Seed.)

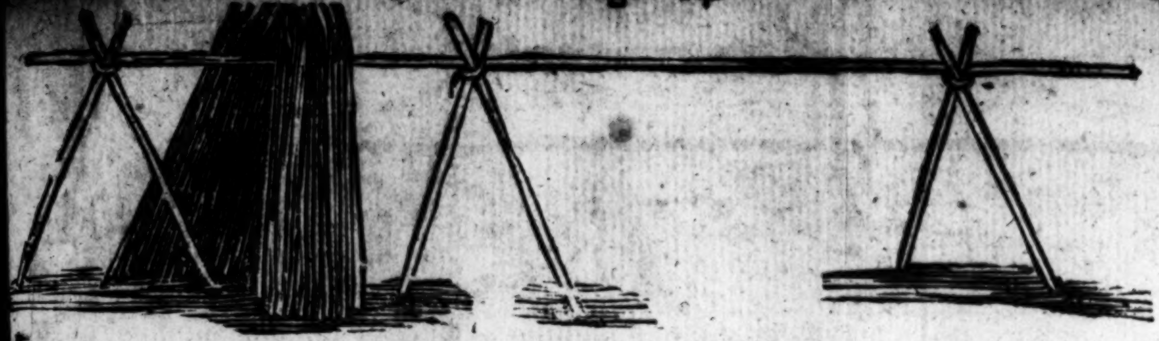
Page 54. Line 11. *for* injuring, *read* injurious.

Page 8. of Mr. *Hall*'s Obſervations Sect. 4. Line 8. *for* as the Top, *read* at the Top. And Line 20. *for* ſo (after Quarries) *read* of.

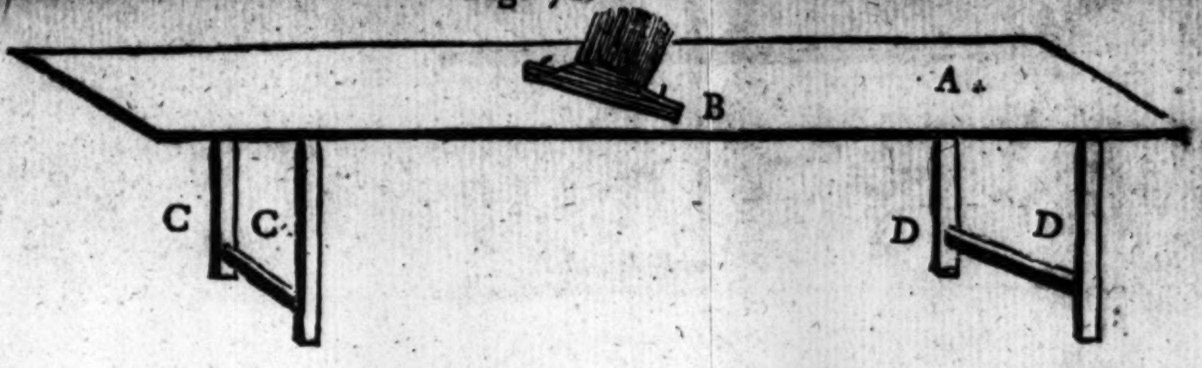
Page 18. of Mr. *Hall*'s Obſervations, Sect. 6. Line 2. *for* early *read* rarely.

355603

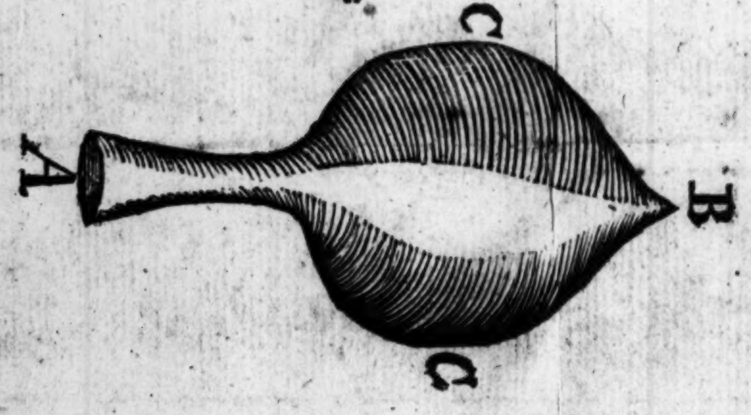
Page 14.



Page 72.



Page 90.



Page 56.